



# **From Theater Missile Defense to Antimissile Offensive Actions**

## ***A Near-term Strategic Approach for the USAF***

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## ***Abstract***

This study examines the question: What strategic approach should the United States Air Force (USAF) take toward theater missile defense (TMD) and antimissile offensive actions in the near term? This study begins with an introductory chapter asking the stated question in context, presenting the methodology used, and summarizing the proposals given at the end of the treatment. The methodological approach to this study involves historical and literature reviews, interviews, and a qualitative comparison of current and proposed weapons systems, capabilities, and doctrine. Broad strategic options, not specific tactical systems, are the focus of this study.

The second chapter reviews milestones of missile and antimissile, diplomatic, and political history to establish a basis for how we arrived at the present situation. Next, the third chapter reviews the current theater ballistic missile (TBM) and weapons of mass destruction (WMD) threat situation. Also, an overview of contemporary political and military reasoning is presented to provide a baseline of support for the critical need of an integrated joint and multilayered TMD. The fourth chapter compares current and near-term antimissile systems and programs, identifies a near-term antimissile capabilities gap, and distills the plethora of situational information to four succinct implications. Finally, the fifth chapter provides and analyzes four proposals for possible actions that the USAF can take to answer the thesis question while taking into account the implications of the current and near-term TBM situation.

Overall, this study recommends a philosophical shift to one in which USAF near-term attack operations (AO) and battle management command, control, communications, computers, and intelligence (BMC<sup>4</sup>I) integration are considered as part of an air and space power antimissile offensive counterair effort, not simply an adjunct to a ground-force driven TMD paradigm. Jointly, this could portend a new antimissile offensive action pillar to buttress the currently defensively oriented joint TMD concept. Tailored Air Expeditionary Force, USAF antimissile centralized control, improved USAF AO and BMC<sup>4</sup>I capabilities, and doctrinal changes are proposed as options to improve the US strategic vulnerability to TBMs and WMD while reducing the impact of the current and near-term antimissile capabilities gap.



## ***About the Author***

Maj Merrick E. Krause was commissioned through the United States Air Force Academy (USAFA) in 1984. Graduating from Euro-North Atlantic Treaty Organization undergraduate pilot training in 1985, he went on to fly F-4Es as an aircraft commander and flight leader, first at Moody Air Force Base (AFB), Georgia, then Seymour Johnson AFB, North Carolina. During the conversion of the first operational F-15E Strike Eagle Wing, Major Krause was selected to transition to fly the F-15E. He subsequently served as an F-15E instructor and evaluator pilot for the 4th Tactical Fighter Wing (TFW) at Seymour Johnson. During Operations Desert Shield, Desert Storm, and Resolve, Major Krause was a mission commander credited with 52 combat sorties, accumulating more than 100 combat and combat support missions in the South West Asia theater. In 1991 he served as acting chief of Wing Standards and Evaluations, 4404th TFW (P), Al Karj and Dhahran, Saudi Arabia. In 1992 Major Krause attended the USAF Fighter Weapons School and served as a test project officer, chief of weapons, Strike Eagle test flight commander, and as an instructor and evaluator pilot in the 57th Wing, Air Warfare Center, at Nellis AFB, Nevada. Major Krause is a senior pilot with over twenty-eight hundred flying hours and 216 combat hours. He has a bachelor of science degree in psychology from USAFA, a master's degree in aviation science and operations from Embry-Riddle Aeronautical University, and a master's degree in airpower studies from the School of Advanced Airpower Studies, Maxwell AFB, Alabama. In June 1998 Major Krause was assigned as a campaign planner at Checkmate, AF/XOOC, at the Pentagon.





## ***Preface***

This preliminary note is intended to help the reader understand the motivation and direction this research project followed. This treatment began as an investigation into the long-term strategic approach of the US Air Force (USAF) toward theater missile defense. After my first few hundred hours of research, however, it changed to a more determined study of a near-term USAF strategic approach to antimissile offensive actions.

My interest in antimissile actions grew out of my participation as a flight leader of many hours of Scud-hunting missions over Iraq during Operation Desert Storm as well as later producing the tactics for several associated tests at Nellis Air Force Base, Nevada, with the 57th Test Group. As an operator, I understood that my experience was limited to employment and not the strategy development that led to the necessity for the missions and tests in which I was involved. Therefore, I tried to enter this research with an open mind and long-term vision to investigate USAF strategy.

Two fundamental concerns surfaced as I digested my research materials. First, it became evident to me that there was a definite antimissile capabilities gap for the US military existing now and remaining until at least the middle of the first decade of the next century. Second, our current joint theater missile defense lexicon addressed air and space power tangentially—relegating an inherently offensive USAF capability to an adjunct status for a strategically critical mission jointly promulgated as defensive. Because of my concern over the antimissile capabilities gap and my perception that theater ballistic missiles were weapons of strategic importance, I shifted the focus of my research from 20 years in the future to today and the next seven years. Instead of the USAF long-term vision, which generally appears well conceived, this study examines the question: What strategic approach *should* the USAF take toward theater missile defense and antimissile offensive actions in the near term?

I hope, perhaps, that my humbly submitted implications and propositions spur further discussion of the subject of USAF antimissile offensive actions. I expect we, as a nation, shall again be confronted with theater ballistic missiles and weapons of mass destruction sooner rather than later. Moreover, I certainly believe that a good USAF antimissile plan now is better than a perfect plan presented one day too late—the morning after an enemy missile, armed with a weapons of mass destruction agent, explodes in a friendly nation's capital or among our troops in the field.



## ***Acknowledgments***

I thank my advisor, Lt Col Clayton K. S. Chun for his patience and guidance. I thank Lt Col David L. Coulliette and Maj Roy Houchin for their insights on technology and space. Dr. Karl A. Mueller provided me with the impetus for future studies in deterrence theory and nonproliferation considerations. This war game was a School of Advanced Airpower Studies (SAAS) (plus School of Advanced Military Study/School of Advanced Warfighting Studies/Naval War College) graduation exercise simulating a complicated high-threat theater missile and weapons of mass destruction environment set early in the next century. I also thank Col Robert C. Owen, Dean of SAAS, for his mentorship. I express my sincere appreciation to my wife, Shari, for her love, understanding, confidence, and support.

## Chapter 1

# Introduction

*Offense is the essence of air power.*

—Gen Henry H. “Hap” Arnold

*Now, the bulk of the money is going to the Army and Navy to develop several different systems for terminal defense against ballistic missiles. I call this the catcher’s mitt approach. Other than to provide early warning and command and control, we have not sought an Air Force role in this part of the TMD equation.*

—Gen Ronald R. Fogleman  
*The Air Force Role in Theater  
Ballistic Missile Defense*

The 1991 Persian Gulf War produced a radical change in the relative importance of the theater ballistic missile (TBM) threat. TBMs, regarded by many military leaders as merely a tactical nuisance when not carrying weapons of mass destruction (WMD), suddenly became weapons of terror with the potential for disproportionate political and diplomatic ramifications. Though United States (US) deterrence appears to have persuaded the Iraqi government to refrain from employing WMDs, conventionally equipped Scuds created a political crisis for the coalition when Iraq attacked Israel with Scuds. A single conventionally armed Scud also produced the greatest number of US fatalities of any single event during Operation Desert Storm when it struck a barracks in Dhahran. Throughout the Gulf War, hundreds of sorties and thousands of man-hours were devoted to countering the Scud threat with less than optimum equipment and training. As a result, the coalition lost the use of those resources that could have attacked other targets, destroyed suspected WMD production and storage facilities, and ultimately may have forced a more rapid conclusion to the Gulf War. Because of the experiences of that conflict, the United States has crossed the missile defense Rubicon and the services are now well committed to defeating future missile threats.

Today, the US Army (USA), Navy (USN), and Air Force (USAF) have collectively spent billions of dollars developing systems to defeat future TBM threats under the collective moniker: theater missile defense (TMD).<sup>1</sup> However, there is frequent overlap between the systems of the individual services and current systems typically used for other military activities. The Ballistic Missile Defense Organization (BMDO), Joint Theater Air and Missile Defense Organization (JTAMDO), and various service entities currently work in cooperation on a variety of systems—a Family of Systems (FoS)—to defeat ballistic missiles.<sup>2</sup> Yet, differences remain in the concepts of employment

based on service histories and traditional roles. As the US government allocates funds for missile defense, any selected architecture should be efficient, economical, and provide the best possible overlapping defensive structure possible, for political, military, and humanitarian reasons.

In an attempt to place the bottom line as close to the front as reasonable, this study examines several concerns. First, it appears that the Department of Defense (DOD) currently has several programs in the works for future long-term area-wide TMD. But, the one option that actually appears to work now is attack operations (AO). Furthermore, AO can be improved in the near term with the minimal infrastructure changes and developmental costs.<sup>3</sup> However, AO currently receives the least funding and attention of all the TMD FoS.

Second, there is no single commander in control over all of the architecture—including all the necessary systems to overlap each phase of a ballistic missile attack.<sup>4</sup> Third, conceptual, developmental, and integrating duties are divided between numerous organizations and services. Additionally, though the Army Theater High Altitude Area Defense (THAAD), Navy Upper Tier, and Navy Lower Tier are laudable programs, they derive a disproportionate piece of the TMD budget for systems that have yet to successfully function. The Patriot is a fair point defense weapon but provides no area defense capability—and it suffers from the drawback of raining deadly debris on friendly territory. The USAF airborne laser is an intriguing concept for the future, but too few are planned for production for effective coverage in two simultaneous major regional conflicts (MRC).

Finally, the high political and strategic priority given to TMD is starkly contrasted by the limited emphasis on developing AO. Indeed, creative adaptations to deal with the ballistic missile threat in the near term are needed before the more recondite systems become available, and to supplement them once new systems are operational. The integration of both offensive and defensive systems is required to provide a truly multilayered and coordinated antimissile and TMD capability.

This treatment investigates the overall question: What strategic approach should the USAF take toward TMD and antimissile offensive actions in the near term? Necessarily, a strategic approach must take into account the existing USAF paradigm of the employment of airpower. In addition, the integration of space power is a consideration. This study presents some fundamental groundwork toward a theory of USAF use of air and space power in a TMD and WMD environment. Once leaders agree on a preferred USAF TMD, or antimissile strategy, there is the need to avoid a dogmatic approach to allow doctrine to evolve as technology improves in the future. Nevertheless, the USAF strategic approach should rely on an extension of the current vision of USAF offensive counterair (OCA), aerial interdiction (AI), and strategic attack (SA) operations, the envisioned role of air and space power, and the predicted nature of air and space power relating to the threat of the future.

There are several reasons the topic of a USAF antimissile strategy is important to research. First, there are future force structure issues to consider, including what to buy, how much, and how best to organize and train those forces. Second, since TMD occurs in a joint environment, a synergistic effect is the most productive and is definitely a goal. This author certainly does not dispute the necessity for multiple layers of systems in an integrated TMD architecture. However, reliance on terminal defensive systems, point defense, or simply “catcher’s mitt” systems is sheer folly—particularly when the USAF and joint DOD air and space power can provide more options. Consequently, ranking prominently among those currently available and desirable antimissile options is attack operations.

Third, the nature of future enemy threats is important in the development of a strategy. Fourth, the issue of one-mission-only versus multi-purpose weapons systems becomes important for cost and flexibility. Fifth, the underlying traditional US vision of airpower, that airpower is offensive by nature, grounds our current and future strategies of air operations and is a prominent part of USAF doctrine—but offensive attacks against TBMs on the ground is considered theater missile defense in the joint paradigm.

This study examines these issues and more to produce proposals, recommendations, and considerations. This discussion contributes toward the development of a USAF theory for the use of air and space power in the near term when operating in a TBM environment. Moreover, the proposals mentioned at the end of this chapter and detailed in the last chapter present some solutions to shape that environment to facilitate victory within the evolving US air and space power paradigm.

## **Methodology**

The methodological approach involves historical and literature reviews, interviews, and a qualitative comparison of current and proposed weapons systems, capabilities, and doctrine. Generally, broad near-term strategic options are the goal of this study. Historical case studies produce the basis of the background section, chapter 2. Operation Crossbow and “The Great Scud Hunt” are examples of important milestones in USAF antimissile strategic option development. This historical review briefly explores some key events and policies between Operation Crossbow and today. Overall, the goal of this section is to explore where we have been to where we are now.

A strategic policy review follows in chapter 3. BMDO, JTAMDO, USN, USA, and USAF TMD paradigms produce the core information for comparison and contrast. Joint publications, service doctrine manuals, congressional reports, personal interviews, and unclassified articles provide the components of each service’s policy paradigm. Minimal discussion of the details of each weapons system comprises the analysis section. This chapter also includes interviews of and briefings by analysts, specialists,

and USAF leaders to assist in determining the extent of the theater missile defense problem and the options to respond to this threat.

Chapter 4 provides a detailed comparison of selected near-term systems introduced in chapter 3. The goal of this chapter is to determine what the implications are of the current TBM problem and the present and near-term antimissile capabilities gap. A comparison of systems options with respect to qualitative capabilities, requirements, and limiting factors is included. Some essential discussion points are range, logistics support required, cost, multimission capability, opportunity costs, environmental feasibility, limitations, and joint environment functionality. Moreover, the Air Force tradition of offense and battle space management versus the catcher's-mitt approach is considered as an alternative effects-based approach.<sup>5</sup> Four implications of the availability and qualitative effectiveness of the current joint TMD environment conclude this chapter.

After the analysis of the near-term program options, given that TMD remains a national priority, four options for a reinvigorated USAF antimissile strategy are proposed in the last chapter of this treatment. The fundamental question in this chapter: What strategic approach should the USAF take toward TMD and antimissile offensive actions in the near term? To arrive at that answer, proposals are presented and analyzed with respect to the intermediate questions: "What can the Air Force bring to the fight, and what optimizes the chance for success with the minimum cost and vulnerability?" The proposals are related to the implications presented in chapter 4 and examined with respect to qualitative projections. Additionally, implications of the various decision options are considered in forming the proposals and reflected in the pros and cons of each proposal.

## **Summary**

The goal of this study is to investigate the question: What strategic approach should the USAF take toward TMD and antimissile offensive actions in the near term? As a result, this study presents proposals to address the implications derived from the analysis of USAF antimissile options. Hopefully, these proposals will generate some discussion to advance the USAF antiballistic (and anticruise missile) programs. In fact, discussion may find that separating antimissile programs from time-critical-target (TCT) concepts is not tenable. Moreover, integration of all elements of battle management command, control, communications, computers, and intelligence (BMC<sup>4</sup>I), including information and space operations, should be included in any USAF future paradigm. There are four proposals presented in this treatment:

- Establish an antimissile/WMD AO Air Expeditionary Groups (AEG) capability.
- Establish a single USAF leader for oversight of all antimissile/WMD force planning, programming, and integrating—a USAF antimissile czar.
- Continuing with all layers of the multilayered joint TMD plan, the USAF should emphasize improving and employing AO in the near term.



- Change joint doctrine to reflect that AO is typically a counterair OCA mission with excursions into AI and SA. This should include the overarching concept that antimissile actions (AMA) are more than TMD; AMA include offensive actions, defensive actions, and BMC<sup>4</sup>I activities.

Theater missile and WMD proliferation creates a new set of challenges for the USAF in this multipolar, post-cold-war world. Once improved, AO and BMC<sup>4</sup>I will effectively project national will, power, and protect our troops and allies with a strong offensive capability in a variety of situations. The implications and proposals are a limited view of a complicated series of debates. But the question of how the USAF should best prepare for near-term TBM and WMD threats is both politically and militarily consequential. Any implications and proposals contained in this treatment are, in this author's opinion, necessary—but they may not be sufficient. Moreover, effects-based integration of OCA, AI, and SA provides a synergy of effects beyond the capabilities of the best defensive only single mission TMD system. Indeed, only quick action to advance USAF BMC<sup>4</sup>I and AO antimissile capabilities combined with a multilayer plan for active and passive TMD led by a concerted diplomatic nonproliferation effort will allow the United States to navigate the next few critical years of international post-cold-war reorganization.

#### Notes

1. "Ballistic Missile Defense Fiscal Year (FY) 96–FY 98 Appropriations Funding," BMDO, on-line, Internet, 19 November 1997, available from <http://www.acq.osd.mil/bmdo/bmdolink/pdf/budget.pdf>. Additionally, multiple sources confirm the specific amounts spent on the various missile defense systems, studies, and research programs. This source is a good, brief summary of specific BMDO projects broken down into procurement, research and development, training and education, and the Military Construction Program.

2. *Family of Systems* is the BMDO preferred term to describe the multilayered architecture of planned TMD systems.

3. Near term, for this study, refers to the period from now to approximately 2005. Midterm is the 2010 time frame. Long term is beyond that.

4. The phases are the prelaunch, boost, midcourse, and terminal. These are discussed in chaps. 3 and 4 of this treatment.

5. Gen Ronald R. Fogleman, "The Air Force Role in Theater Ballistic Missile Defense," address delivered to the American Defense Preparedness Association/National University Foundation Breakfast Seminar Series on Missile Defense, Counter Proliferation, and Arms Control, Washington, D.C., 16 June 1995. The general's use of the term *catcher's mitt* is not pejorative, merely descriptive. The author uses this term throughout to describe primarily terminal, but generally defensive, single mission antimissile systems.

## Chapter 2

# Background

*Soldiers usually are close students of tactics, but rarely are they students of strategy and practically never of war.*

—Bernard Brodie

There are two overt functions of ballistic missiles: to create fear and to destroy objects or people. Historically, the importance of the former to the populace of democracies and the potential of the latter to the civilian and military leaders are the mechanisms that create the necessity to provide some defense from ballistic missiles. Indeed, these very mechanisms and the relative ease with which a nation can affect terror with cheap and available technology, create strong incentives for third world countries to employ missiles to leverage larger and stronger forces. Moreover, cheap and available technology allows proliferation of TBMs and WMD to continue unabated.

TBMs are merely a subset of the greater ballistic missile threat. With regard to the function of the theater ballistic missiles, based on current threats, these missiles are judged more of a threat overseas than to the continental United States (CONUS)—though this may change.<sup>1</sup> In a given theater, terror may still be employed as a mechanism for coercion with the use of inaccurate TBMs. With the inclusion of weapons of mass destruction, small enemies can produce strategic effects against the United States, North Atlantic Treaty Organization (NATO), and United Nations (UN) forces.

The current Air Force paradigm for dealing with missile defense generally differs from the focus of most USN, USA, and US Marine Corps (USMC) concepts. The essential difference is one of culture and philosophy. Based on the traditionally offensive nature of airpower compared to the traditional surface force preoccupation with obtaining the security of their forces through defensive means, service technology and doctrinal approaches differ with respect to how missile defense is visualized, architecturally constructed, and in the inherent philosophy of missile defense.

Traditionally, the Air Force prefers to strike enemy threats preemptively, given the offensive nature of bombers, while the surface forces tend to concentrate on self-protection through defensive measures. This preference may demonstrate a simple difference of opinion between defensive and offensive strategies based on the USAF legacy of Giulio Douhet, William “Billy” Mitchell, the Air Corps Tactical School (ACTS), and the Combined Bomber Offensive (CBO). This offensive strategy can produce areawide defensive results. However, as billions of dollars are spent

designing a TMD system, it is interesting to note that the preponderance of the monies allocated to TMD and the BMDO go toward defensive catcher's-mitt systems that are typically more point defensive systems. This relegates offensive systems, designed to exploit the advantages of air-power, particularly, speed, range, rapid coordination, and flexibility, to a less funded and minimally promoted position.

The intent of this chapter is to answer the question: What are the historical steps that have led toward the current US joint TMD posture? This chapter explores these questions through a brief historical accounting of the development of key missile defense systems and philosophies.

### **Operation Crossbow**

Zeppelins and Gotha bombers graphically introduced aerial terror bombardment to the "civilized" nations in Europe in World War I. As early as 1915, inventors in the United States were experimenting with the idea of a "flying bomb," testing a prototype device in mid-1916.<sup>2</sup> However, World War II saw the first massive employment of systems similar to today's missile threat: the German V-1 and V-2. Operation Crossbow was the substantial Allied response to the German missile threat in the European theater. Between August 1943 and March 1945, the US Army Air Forces (AAF) and Royal Air Force (RAF) flew 68,913 sorties and expended 122,133 tons of ordnance in the campaign to destroy German missiles.<sup>3</sup> Indeed, Operation Crossbow was a large-scale counterair operation that caused a substantial diversion of both tactical and strategic aircraft to both delay the V-weapon attacks and limit their effects once the Germans began employing the weapons.<sup>4</sup>

There are two points of view to consider regarding the V-weapons in World War II: military and political. First, militarily, it was not apparent what effects the Germans wished to achieve through launching the V-weapons. The military effects that Allied leaders envisioned included a delay of Operation Overlord, disruption of the landing and invasion, slowing of the CBO against the German homeland, and leading to a relaxation of the Casablanca directive of unconditional surrender.<sup>5</sup> Though the German V-weapon threat was identified and realized, military intelligence was not up to the task of effectively finding and destroying all the V-1 and V-2 sites and their respective production and storage facilities due to command, control, communications, and intelligence (C<sup>3</sup>I) deficiencies. Though many V-1 launch sites were destroyed and some scientists were killed, the overall effectiveness of the Allied attacks were limited as thousands of V-weapons were launched.<sup>6</sup> Moreover, the potential for destruction of the V-weapons was viewed as more important than their actual capability. Gen Dwight D. Eisenhower noted that if the Germans were more successful in maturing their V-weapon capability six months earlier, then the Allied invasion would have been "exceedingly difficult, perhaps impossible."<sup>7</sup>

On the political front, Winston Churchill clearly recognized the threat to his country in late 1942 and early 1943. Military intelligence reports also alluded to the possibility of WMD weapons being launched on missiles against Britain. Churchill created a panel to investigate and make recommendations about the German V-weapons' potential. The potential of WMD armed missiles striking Britain added political concerns and urgency to the military calculus to increase both offensive and defensive countermeasures for self-protection.<sup>8</sup> These measures included aerial bombardment attacks and increased home defenses, particularly antiaircraft artillery (AAA) and night interceptors. Finally, the impact of terror weapons on national morale and the public pressure on both political and military leaders were indirect effects of the V-weapons.

Technologically, the V-weapons were primitive; they were inaccurate and carried a light payload. Conversely, the Allied response to the V-weapons was strategic interdiction of the launch sites, storage and production facilities, radar acquisition, and ground control intercept (GCI) vectoring of fighters to shoot down the small aircraft like V-1s in flight, and AAA as a defense of last resort to destroy incoming missiles. The Germans recognized their launcher's vulnerability, particularly after 25,150 attack sorties, with a cost of 154 Allied aircraft and 771 crew members between 1 December 1943 and 12 June 1944.<sup>9</sup> A cat-and-mouse game continued as Allied aircraft hunted camouflaged or concealed launch sites with binoculars and limited premission intelligence. Between 12 June and 3 September 1944, another 26,000 Allied sorties were flown with limited effectiveness against the V-weapons.<sup>10</sup>

Because of a faster, higher ballistic missile profile, V-2s were more difficult to locate and destroy. Between September 1944 and March 1945, more than twenty-five hundred V-2s killed thousands in Britain and on the continent.<sup>11</sup> Indeed, many British civilians were terrified by the lack of warning for the V-2, though the V-1s caused more fatalities.<sup>12</sup> Apparently, the only attack option the Allies pursued that caused effects on the V-2 program was the attack on the German transportation system.<sup>13</sup> Though they were not successful in stopping the casualties due to the V-weapons, Crossbow did slow the introduction of the V-1 and V-2 by three to six months, making it a qualified success.<sup>14</sup>

### **Emerging USAF Missile Defense Roles**

The need to define missile roles between the Air Force and its parent, the Army, emerged when a newly minted US Air Force arose as a separate service after the National Security Act, 26 July 1947. The Army-Air Force Implementation Agreements, 15 September 1947, began defining the separation of functions of the services that included assigning certain intelligence functions, strategic missile responsibility, air defense AAA, and research and development (R&D) responsibility for guided missiles to the USAF. However, the Army retained control of the tactical missile systems—strategic systems moved to USAF responsibility.<sup>15</sup> Though these

agreements defined many roles and functions, years of contention followed.

On 19 July 1948 the USAF gave the Army control over the R&D of guided missiles to fulfill Army roles and missions. However, all three services required guided missile programs. To reduce the overlap between the systems and the lack of “clear delineation” of the responsibility for current and future missile systems, Secretary of Defense Louis A. Johnson signed a Guided Missile Memorandum on 21 March 1950.<sup>16</sup> The result of this memorandum was to give the USAF exclusive control over strategic missiles, and responsibility for missiles that replaced fighter interceptors (in conjunction with the USN) and replaced ground support aircraft (in conjunction with the USA). Additionally, the USAF and Navy shared air-to-air and air-to-ground missile responsibilities based on specifically named systems.<sup>17</sup> Moreover, the Vandenberg-Collins Agreement, 1 August 1950, provided roles and cooperative arrangements between the USAF and USA with respect to air defense organizations, placing Army staffs at each echelon of the AF command structure.<sup>18</sup>

Roles and missions debates continued. In 1952 several points were accepted between the Army and Air Force, including:

- Neither service would try to modify the other’s roles and missions.
- The terms “tactical” and “strategic” would not constitute a specific range.
- Surface-to-air weapons used as either extended or supporting artillery remained the Army’s responsibility.
- The Air Force would not oppose Army development of missiles for low altitude surface-to-air interception.
- Missiles that would replace fighter interceptors were the responsibility of the USAF.
- “Battlefield isolation and interdiction of movement were Air Force functions.”<sup>19</sup>

The controversy continued as both interceptor and long-range ballistic missile technology developed. Three separate missile development programs, one for each service, and numerous specialized ballistic and cruise missile weapons systems continued. The USAF guided missiles retained aircraft designations and were treated as unmanned aerial vehicles (UAV). Moreover, the USAF created an Air Defense Command (ADC) to protect CONUS from Soviet bombers and established listening posts and collection networks in distant North America and along the coasts of the United States. The Bomarc, an early and significant USAF attempt at an unmanned aerial interceptor to supplement the manned interceptors for the ADC, was designated the XF-98.

### **Bomarc**

The only surface-to-air missile (SAM) developed by the USAF is the Bomarc, which grew out of a 1949 agreement with Boeing Aircraft to develop a pilotless interceptor that could destroy both bombers and cruise missiles.<sup>20</sup> The Bomarc was an unmanned interceptor—a cruise missile.

Launched vertically, the Bomarc would climb to altitudes over 50,000 feet, then rotate to a horizontal, more conventional type attitude. Once within 10 miles or so of its target, the Bomarc's internal radar would guide the unmanned aircraft until intercept. In 1961 the Super Bomarc (Bomarc B) was tested against two USN Regulus II missiles, intercepting the designated target at Mach 2, 100,000-foot altitude, and 375 miles downrange.<sup>21</sup> At the height of the USAF Bomarc missile defense force, the USAF had 242 Bomarc B missiles in active duty. Deactivation began in 1964 and the last Bomarc was deactivated on 1 July 1972.<sup>22</sup>

## **Nike**

With its genesis in World War II, the USA Nike was a surface-to-air ballistic missile. Nike became a project on 8 February 1945 after a contract was issued to a contractor to produce a study report on anti-aircraft guided missile problems.<sup>23</sup> In August 1945 the Army Air Forces learned that Army Ordnance Department (ASF) planned to change the Nike into an interceptor missile by adding airfoils for maneuverability. This addition was a violation of the McNarney Directive, which stipulated that the AAF would develop missiles that relied on lift, or were launched from aircraft. Additionally, the directive stipulated that the ASF would develop surface launched missiles that relied on momentum for flight. Doctrinal division with regards to missiles was indeed evident before the creation of a separate USAF.<sup>24</sup>

The USA's Nike Hercules was a planned improvement to the Nike line that was planned before the Nike Ajax became operational. Achieving a production number of over 25,000 with 863 deployed by the United States, the Nike Hercules was a momentous effort designed to defend against an exaggerated Soviet nuclear bomber threat. Though the Congress wanted to decommission the Hercules in 1968, pressure from NATO allies forced the deployment until the SAM-D (now called the Patriot) was available for continued protection until 1984, when the last Nike Hercules was withdrawn from Europe.<sup>25</sup>

Though the Nike Hercules was designed for bomber defense, the Nike-Zeus was designed to intercept hypersonic aircraft and intercontinental ballistic missiles (ICBM). Another Army project concurrent with Thor and Jupiter, among other systems development, the Nike-Zeus was significant in that it was designed to intercept its targets in space. Before the sputnik launch, all Army missiles were restricted to a 200-mile maximum range—after sputnik, the 1956 range restriction was rescinded, opening a new venue for Army space operations. Though never deployed as an antiballistic missile (ABM), Nike-Zeus did become operational as an Army nuclear delivery device.<sup>26</sup>

## **Thor**

Confusion between “tactical” and “strategic” systems continued with the Thor project. The Thor was originally known as a tactical ballistic

missile, then later redesignated as an intermediate range ballistic missile (IRBM), with a range of one thousand to two thousand miles. Though originally employed to replace the Matador tactical missile, the USAF decided the Thor belonged in the strategic category. Additionally, the Thor was intended to counter a proposed Soviet fractioning orbital bombardment system, a space-based weapon proposed in the late 1950s. In a parallel development track, the Thor continued as an Air Force program while a combined Army-Navy Ballistic Missiles Committee began development of the Jupiter IRBM. ICBMs and IRBMs were assigned equal priority.<sup>27</sup>

A 10 November 1955 Air Force revised plan detailed the ICBM/IRBM administrative procedures. It also called for two IRBM programs of equal priority, an Office of the Secretary of Defense (OSD) Ballistic Missiles Committee and an Air Force Ballistic Missiles Committee. The Air Force continued to consider the question of missile priorities, development, and deployment.<sup>28</sup> However, once sputnik was launched on 4 October 1957, American ICBM programs and the Thor-Jupiter controversy accelerated. Because of the “dynamic nature” of the missile programs, Air Force leaders made provisions for frequent administrative and organizational changes.<sup>29</sup> Doctrinal and mission overlap and confusion continued as technology speeded systems development.

### **Sprint/Spartan**

Because of shortcomings of the Nike-Zeus in destroying ballistic missiles in the atmosphere, the Army began a study in 1959 for development of a high-speed terminal phase interceptor. Concurrently, the improved Nike-Zeus became the Spartan, the last US nuclear-tipped ABM. Together, these two weapons systems promised to provide overlapping nuclear ABM coverage.

In September 1967 Secretary of Defense Robert S. McNamara announced that President Lyndon B. Johnson decided to deploy the Sentinel ballistic missile defense system. In 1969 President Richard M. Nixon renamed the Sentinel system to the Safeguard system, and realigned the focus of the ABMs to a mission of protecting US ICBM launch facilities.<sup>30</sup> Test missiles were flown from 1970 to 1973. However, with the signing of the Treaty on the Limitation of Anti-Ballistic Missile Systems (SALT I) on 26 May 1972, US ABM systems development was severely restricted. With the acceptance of the 2 July 1974 ABM treaty, which restricted the United States and the Soviet Union to two 100 missile ABM sites each, further US ABM systems development slowed. On 1 October 1975 the only US ABM site at Grand Forks AFB, South Dakota, became operational with 70 Sprints and 30 Spartans.<sup>31</sup> In 1983 further development of the Sprint and Spartan weapons systems was supplanted by research into conventional ABMs and Thor was terminated.

## **Strategic Defense Initiative**

Remembering a visit to Cheyenne Mountain as a presidential candidate, President Ronald W. Reagan announced a new missile defense policy in a speech on 23 March 1983. National Security Directive 85 became the formalized policy announcement that called for an extensive R&D program to provide a missile defense system to protect the United States from nuclear equipped ICBMs through space acquisition and intercept technology. Two studies were commissioned and completed that year: the Defensive Technologies Study (the Fletcher Report) and the Future Security Strategy Study (FSSS) (the Hoffman Report).<sup>32</sup>

The FSSS reported that missile defenses could enhance deterrence and that an antitactical ballistic missile system could become the seed technology for a future national missile defense (NMD) system. The Fletcher Report, not completed until early 1984, proposed different funding levels and plans for the president's directed research programs. The recommended plan became a guide for the Strategic Defense Initiative (SDI) and also recognized common links between terminal theater and ICBM systems (i.e., catcher's-mitt systems).

On 6 January 1984 the Presidential National Security Decision Directive 119 formally established the SDI to explore "the possibility of developing missile defenses as an alternative means of deterring nuclear war."<sup>33</sup> The Strategic Defense Initiative Defense Organization (SDIO) was created to administer the SDI program. The missile defense resurrection sparked years of debate over the provisions and necessity of the ABM treaty, including friction within the United States and between the United States and the Union of Soviet Socialist Republics. SDI continued as a nonnuclear based series of technology options to provide a BMD system.

Judge Abraham Sofaer, the State Department legal advisor, presented his 1987 conclusion that the ABM treaty did not "preclude testing of space-based missile defense systems, including directed energy weapons."<sup>34</sup> Defensive satellites (DSAT), antisatellites (ASAT), and active terminal defense systems were seriously considered and options were explored. These were not necessarily prohibited since the Outer Space Treaty nebulously precluded military bases and weapons testing on the moon or other undefined celestial bodies and nuclear or WMDs in space. The 1972 SALT I ABM treaty (Annex D) was focused on interference with "national technical verification," mainly reconnaissance and surveillance satellites.<sup>35</sup>

Theater missile defense (TMD) systems were studied concurrently with national defense systems. The Patriot Advanced Capability (PAC)-2 successfully destroyed another Patriot missile simulating an SS-23 ballistic missile in a November 1987 test while Brilliant Pebbles studies continued through the Reagan and Bush administrations. Also, ASATs launched by F-15 fighters at Edwards AFB, California, were discussed in the media.



When Iraq invaded Kuwait in August 1990, TMD emerged as a predominant factor in the missile defense funding calculus. House of Representatives (H.R.) bill 101-938, the FY 1991 Appropriation Conference Committee Report, called for a centrally managed TMD program to be established by the secretary of defense. Additionally, funding was to be provided through 1997 and multiservice requirements and participation was planned.<sup>36</sup>

## **Gulf War**

“The Scud, not the airplane, was Iraq’s primary weapon during the air war. CENTCOM’s air strikes hindered the Iraqi missile crews, but they never stopped them.”<sup>37</sup> Though Iraq employed theater ballistic missiles and chemical attacks during the Iran-Iraq war in the 1980s, few of the US public appreciated either the extent or implications of the WMD threat from third world countries. The very real possibility of US troops being attacked by ballistic missiles armed with biological or chemical agents appeared as a surprise—particularly when the Soviet Union was not associated with the attacks. However, US forces were not completely unprepared to deal with theater ballistic missiles. With a combination of defensive and offensive measures, a moderately effective TMD posture deployed during Operation Desert Shield. Before launch, fighter-bomber aircraft were capable of attacking fixed Scud sites with a high degree of reliability, and the United States had the capacity to preemptively attack mobile Scud transporter erector launchers (TEL) with a somewhat lower degree of fidelity due to intelligence and command, control, communications, computers, and intelligence (C<sup>4</sup>I) limitations. Scud sites and TELs were also subject to attack after their location was identified postlaunch. Additionally, PAC-2 missiles, modified during the 1980s to provide greater antimissile capabilities, provided a necessary backup defense when attack operations failed to eliminate all threats preemptively. Without offensive airpower and defensive antimissile systems, the strong (but ambiguously stated) US WMD deterrence posture and the outstanding conventional capabilities of the United States and coalition, WMD armed Scuds might have killed thousands. Therefore, the potential existed that a tactical weapon might have created horrific strategic effects.

Although Central Command (CENTCOM) planners retained plans to attack fixed Scud launchers in Iraq, they did not plan on attacking mobile launchers since the Scuds were considered a “nuisance” weapon.<sup>38</sup> However, a different policy appears in interviews. For example, based on Brig Gen Buster C. Glosson’s comments at a planning meeting in Saudi Arabia in mid-September 1990, he predicted F-15E tasking to attack mobile Scud sites.<sup>39</sup> “He (Gen. Glosson) made us realize what a problem we would have if Israel got involved because of the Scuds. . . . He said, ‘I know good and well we can use your airplanes better doing other things, but I can tell you right now, we’re going to use a lot of your sorties chasing Scuds.’”<sup>40</sup>

Although General Glosson anticipated a Scud hunt for “political” reasons, Gen H. Norman Schwarzkopf reportedly, even after several Scuds were launched against Israel, regarded the Scuds “as having little military significance.”<sup>41</sup> Eliot A. Cohen and Thomas A. Keaney note that the strategic air campaign changed on the second day of the war when “the first Scud missiles launched from western Iraq landed in Israel.”<sup>42</sup> Moreover, the Scud threat, WMDs, and the implication of Israel entering the war and thus dividing the coalition preoccupied Bush administration leaders: “The Pentagon knew it had a big problem on its hands. In the inner councils of the Bush administration, no problem worried officials more than what might happen if Israel entered the war.”<sup>43</sup>

Though Iraqi fixed Scud sites were targeted on the first night, particularly in western Iraq, the pervasiveness of the mobile Scud threat became obvious the second night when Iraq fired Scuds at Israel. Considerable assets were diverted from strategic attack, interdiction, and other missions to suppress the mobile Scuds. The diversion of aircraft and bandwidth was greater than expected. Additionally, since the results of preemptive attacks against mobile launchers were not conclusive, pundits question the effectiveness of attack operations on mobile Scud TELs.

The Scud hunt included continuous airborne surveillance of western and southern regions of Iraq, positioning strike aircraft within Scud launch areas for more immediate targeting, attacks on communications links thought to be transmitting Scud launch authorization, attacks on suspected sites, and strikes against Scud production and storage facilities. By war’s end nearly every type of strike and reconnaissance aircraft employed in the war participated in the attempt to bring this threat under control, but with scant evidence of success.<sup>44</sup>

Though the rate of Scud launches decreased with coordinated attack operations, faults were obvious in the joint concept of preemptive antimissile operations. A critical problem was the lack of near-real-time intelligence and near-perfect information.<sup>45</sup> Moreover, intelligence was a limiting factor in finding mobile Scuds and equipment. Coupled with those concerns were limitations on disseminating the information to special operations forces (SOF) or attack aircraft with appropriate sensors to find and destroy the mobile targets.

The *Gulf War Airpower Survey* noted the mixed effectiveness of attack operations. The authors observed that the Iraqi Scud campaign failed in its effort to split the coalition. Though the Scud weekly launch rate decreased by approximately 50 percent after the first week and then remained low throughout the rest of the conflict, the Scud hunt was not deemed a success. This 100 percent success or failure mentality sets an interesting measure of accomplishment and an unrealistic bar in war. “So beyond the disruption induced by the level of effort put into the hunt for the launchers, Coalition air power does not appear to have been very effective against this militarily insignificant target category.”<sup>46</sup>

On 25 February 1991 a conventionally armed Scud destroyed a US barracks in Saudi Arabia killing 28 Pennsylvania US Army Reserve soldiers. Like the air and SOF campaign against the Scuds, this mishap and the occurrence of Scud parts raining down on Israel and Saudi Arabian cities was evidence that the catcher's-mitt systems, particularly the Patriot, also had controversial results. Though the Patriots obviously contributed politically to maintaining the coalition, as both a defensive military weapon and a bargaining chip to keep Israel pacified during attacks, their overall capability was disputed. The public debate over the operational effectiveness of Patriots and the nature of theater missiles, particularly their potential for creating both political and military results, encouraged both military and political investigations into improving TMD more rapidly.<sup>47</sup>

### **TMD and Antimissile Efforts through the 1990s**

There was fairly rapid political movement to respond to Scud and other TBM threats in the US government after the demonstrative results in the Gulf War. March 1991 saw the establishment of a separate SDIO TMD department in response to H.R. bill 101-938 and the increased visibility of TMD requirements. On 5 December 1991, President George W. Bush signed H.R. bill 2100, the National Defense Authorization Act for Fiscal Years 1992 and 1993, requiring the Department of Defense to "aggressively pursue the development of advanced theater missile defense systems, with the objective of down selecting and deploying such systems by the mid-1990s."<sup>48</sup>

Numerous flight and operational tests and exercises were accomplished in the areas of attack operations; battle management command, control, communications, computers, and intelligence; and a variety of catcher's-mitt systems.<sup>49</sup> In 1993 the SDIO was redesignated as the Ballistic Missile Defense Organization. The 1993 Bottom-Up Review provided \$12 billion to theater missile defense for the years FY 95 to FY 99.<sup>50</sup> This substantial commitment of funding demonstrated the intent to pursue serious TMD R&D efforts.

Another organization stood up in January 1997 to contribute to US TMD capability was the Joint Theater Air Missile Defense Organization. The objective of this office was to integrate the Defense Department's "requirements and activities for theater air and missile defense (TAMD)."<sup>51</sup> Further advancing the philosophy that the component commanders and military services should be involved in the development of joint mission capstone requirements, TMD architecture, and a joint capabilities roadmap, JTAMDO functions under the J-8 staff.<sup>52</sup> Essential verbiage in the JTAMDO charter includes the terms *systems interoperabilities* and *operational architectures*. The coordination between the services' TMD programs and the production of a TAMD master plan was a step to further integrate systems beyond contentious roles and missions discussions and TMD philosophies of the services.

Test and exercise efforts within the USAF, not directly funded by the BMDO, continued to expand the USAF capability to contribute to TMD, particularly through BMC<sup>4</sup>I, airborne laser (ABL), and attack operations tests and exercises.<sup>53</sup> The USAF chose to emphasize its attack operations and the ABL as the near-term and future mechanisms to kill enemy ballistic missiles. Having relegated the catcher's-mitt systems to the other services, the USAF approach grew to promote the inherent flexibility of air and space power to destroy TELs and support equipment and personnel if presented with the proper intelligence in a timely manner. This effects-based approach went beyond merely striking TELs. Including the command and control (C<sup>2</sup>) nodes and supplies broadened the contribution of USAF AO. The incorporation of both direct attacks and indirect attacks by the USAF (and airpower in general) further advances US antimissile strategies. Additionally, post-Gulf War analysis within the USAF led to concentrated efforts on data link and increasing both the accuracy and speed by which information was transferred to aircrews. This preemptive and boost phase direction of USAF efforts dovetailed nicely with the BMDO emphasis on catcher's-mitt systems, providing distinct and critical USAF contributions.

### **Background Conclusions**

This chapter attempted to answer the question: What are the historical steps that have led toward the current US joint TMD posture? A brief historical sketch was drawn of the development of key missile defense systems and philosophies. The historical steps that have led to this point of increased international and particularly US emphasis on TMD have their roots in the rockets and crude cruise missiles of World War II. However, doctrinal arguments and blurring of the roles and missions of the services have permitted both doctrinal debates and disagreement over the best manner to dissipate the TMD and WMD threat. With regards to TBMs specifically, however, there is no debate on one conclusion: a multilayered approach is required. BMC<sup>4</sup>I, attack operations, and the future ABL appear to currently constitute the strategic USAF contributions to TMD and antimissile systems. More contentious are the issues of the allocation of funding priority, specific systems development programs, the balance of proactive antimissile actions versus reactive TMD, and the role of the joint force air component commander (JFACC) in the air defense role.<sup>54</sup>

Currently, there are USAF and joint systems in the field that improve both BMC<sup>4</sup>I and attack operations, though another Scud hunt has not tested their effectiveness. The next chapter addresses current and planned key TMD systems. It begins with a review of the 1991 Joint Requirements Oversight Council (JROC) Theater Missile Defense Mission Need Statement. Particularly emphasized are the USAF systems planned for present and near-term use. Doctrinal discussions are mentioned for

context, but the roles and missions debates are not investigated in depth in this study.

#### Notes

1. "Ballistic Missiles and the World Security Environment," *BMDO Fact Sheet*, n.p.; on-line, Internet, 12 January 1998, available from <http://www.acq.osd.mil/bmdo/bmdolink>.
2. Kenneth P. Werrell, *The Evolution of the Cruise Missile* (Maxwell AFB, Ala.: Air University Press, September 1985), 7. Werrell provides a historical development of the cruise missile concept. Peter C. Hewitt is cited with approaching Elmer C. Sperry with the "flying bomb" idea in 1915. This is recorded in a report by Bion J. Arnold to the Secretary of War, "Secret Report on Automatic Carriers, Flying Bombs (FB), Aerial Torpedoes (AT)," 31 January 1919, Air University Library, no. 623.451 W253B.
3. *United States Strategic Bombing Survey (USSBS)*, vol. 60 (Washington, D.C.: Military Analysis Division, 1945), 26-27.
4. *USSBS: V-Weapon (Crossbow) Campaign*, 4.
5. Wesley Frank Craven and James Lea Cate, eds., *The Army Air Forces in World War II*, vol. 3, *Europe: Argument to V-E Day* (Chicago: University of Chicago Press, 1951), 85.
6. *USSBS*, vol. 2, 88; *USSBS*, vol. 60, 5; and Werrell, 60-61. Werrell reports that the Germans fired 10,492 V-1s against Britain and up to another nine thousand against targets on the continent of Europe. He cites the *USSBS*, "Aircraft Factory Division Report" (Maxwell AFB, Ala.: Air Force Historical Research Center, no. 137.302-3), 115, when he notes that the Germans built approximately 30,000 V-1s with 60,000 planned.
7. Dwight D. Eisenhower, *Crusade in Europe* (Garden City, N.Y.: Doubleday, 1948), 260.
8. Lt Col Mark Kipphut, "Theater Missile Defense: Reflections for the Future," *Air Chronicles*, January 1998, 3; on-line, Internet, January 1998, available from <http://www.cdsar.af.mil>.
9. Werrell, 44. Numerous sources also provide similar statistics. Regardless of the exact number of sorties, it is obvious that a considerable effort was expended in attacking German V-weapon launch sites in Crossbow.
10. *Ibid.*, 49.
11. *The Proliferation Primer* (Washington, D.C.: Committee of Governmental Affairs, United States Senate, January 1998), 57.
12. David Johnson, *V-1 & V-2: Hitler's Vengeance on London* (Manor, N.Y.: Stein and Day, 1982), 66, 76, 87, 105, and 157. Johnson's book covers several firsthand accounts as well as some statistics.
13. *USSBS*, vol. 60, 23.
14. Kipphut, 4. I agree with Kipphut's assessment of the *USSBS, V-Weapon (Crossbow) Campaign*, 2-4. He also used the term *qualified success*. Additionally, Michael J. Neufeld, *The Rocket and the Reich* (New York: Free Press, 1995), discusses the impact of AO on the V-2 program. Neufeld details the dispersal required by air attacks and the conditions of the slave labor the Nazi state forced to build their V-weapons. AO certainly affected V-weapon production and employment.
15. Richard I. Wolf, *The United States Air Force Basic Document on Roles and Missions* (Washington, D.C.: Office of Air Force History, 1987), 91. Section IV of the Army-Air Force Implementation Agreements, 15 September 1947, define which service gets what missiles. Additionally, AAA and training were discussed in this section. Wolf provides commentary, much of which is cited from Robert Frank Futrell, *Ideas, Concepts, and Doctrine*, vol. 1, *A History of Basic Thinking in the United States Air Force 1907-1964* (Maxwell AFB, Ala.: Air University Press, 1989). Additionally, Wolf provides the text of the original agreements and memoranda.
16. Wolf, 207.
17. *Ibid.*, 207-20.
18. *Ibid.*, 219-20.
19. Jacob Neufeld, *Ballistic Missiles in the United States Air Force 1945-1960* (Washington, D.C.: Office of Air Force History, 1990), 87-89.

20. James Norris Gibson, *The History of the US Nuclear Arsenal* (Greenwich, Conn.: Brompton Books, 1989), 165–66.
21. *Ibid.*, 153–54. The Regulus II was the only supersonic surface-to-surface cruise missile developed by the US Navy.
22. *Ibid.*, 167.
23. US Army Ordnance Missile Command, *Nike-Ajax*, Historical Monograph, Redstone Arsenal, Ala., 1 July 1962, 3.
24. Jacob Neufeld, 18–21.
25. Gibson, 172–74.
26. *Ibid.*, 168–70.
27. Jacob Neufeld, 143–49.
28. *Ibid.*, 271–313. The appendices included by Neufeld contain detailed memoranda concerning the early arguments over missile policy and administration.
29. *Ibid.*, 167–80.
30. BMDO, “Missile Defense Milestones,” n.p.; on-line, Internet, 2 December 1997, available from <http://www.acq.osd.mil/bmdo/bmdolink>.
31. Gibson, 170–72.
32. BMDO, “Missile Defense Milestones.”
33. *Ibid.*
34. *Ibid.*
35. John M. Collins, *Military Space Forces: The Next 50 Years* (New York: Pergamon Brassey’s International Defense Publishers, 1989), 46–47 and 67. This book was a report commissioned by the US Congress in 1987 to prepare “a frame of reference that could help Congress evaluate future, as well as present, military space policies, programs, and budgets.” This was stated in the Congressional Introduction in Collins’s book, xvii. Congressmen Skelton, Nelson, Spratt, Kasich, Volkmer, Blaz, and John Glenn signed the introduction and noted that congressional attention was required on the contained space and security issues.
36. BMDO, “Missile Defense Milestones.”
37. Michael R. Gordon and Bernard E. Trainor, *The Generals’ War: The Inside Story of the Conflict in the Gulf* (Boston: Little, Brown and Co., 1995), 228.
38. Eliot A. Cohen and Thomas A. Keaney, *Gulf War Air Power Survey (GWAPS) Summary Report* (Washington, D.C.: Department of the Air Force, 1993), 43.
39. General Glosson was the leader of the Black Hole planning group in Riyadh. The F-15E aircrews he referred to had not trained for Scud-hunting missions, as it was a new concept and role.
40. William L. Smallwood, *Strike Eagle* (Washington, D.C.: Brassey’s, 1994), 47. This portion of the decision-making process regarding attack operations and the Scud hunt was recounted by an F-15E squadron weapons officer who attended several planning meetings with General Glosson. His comments revolved around a 15 September 1990 discussion with General Glosson.
41. Gordon and Trainor, 229.
42. Cohen and Keaney, 17.
43. Gordon and Trainor, 230.
44. Eliot A. Cohen and Thomas A. Keaney, *Revolution in Warfare? Airpower in the Persian Gulf War* (Annapolis: Naval Institute Press, 1995), 14–15.
45. Maj Gen Courder, interviewed by author, 18 September 1997. General Courder’s discussion of Dynamic Battle Control as required in the concept of operations for the attack of time critical targets is explored in more detail in chapters 3 and 4. “Near real time, near perfect picture,” is a frequently cited desire for C<sup>4</sup>I and integration with a variety of airpower functions, including attack operations.
46. Cohen and Keaney, *GWAPS Summary Report*, 88–90.
47. Particularly when factoring in WMD, the TBM debate showed that the political dimension of missile employment that was evident since World War II continued.
48. BMDO, “Missile Defense Milestones.”
49. BMC<sup>4</sup>I is frequently interchanged with the acronyms C<sup>4</sup>I, C<sup>3</sup>I, and BM/C<sup>3</sup>I, in a variety of missile defense publications and speeches. I use *BMC<sup>4</sup>I* to include all nonattack technologies and issues revolving around the collection and interface arena with respect to ballistic missile defense. Gen Ronald R. Fogleman used the term BMC<sup>4</sup>I in his presentation: “The Air Force Role in Theater Ballistic Missile Defense,” remarks delivered to the

American Defense Preparedness Association/National University Foundation Breakfast Seminar Series on Missile Defense, Counter Proliferation, and Arms Control, Washington, D.C., 16 June 1995. The BMDO uses the term *BM/C<sup>3</sup>I*, dropping “computers,” on-line, Internet, available from <http://www.acq.osd.mil/bmdo/bmdolink/html/tmdccc.html>. Other briefings and presentations use amalgams of these terms, but refer to them in a similar fashion. Air Combat Command has used the term C<sup>4</sup>ISR to denote adding surveillance and reconnaissance.

50. BMDO, “Missile Defense Milestones.”

51. Office of the Secretary of Defense, “Joint Theater Air Missile Defense Organization,” news release, no. 021-97, 16 January 1997.

52. J-8 is the Joint Staff’s Director for Force Structure, Resources, and Assessment. JTAMDO is functionally located under this directorate.

53. Some tests and exercises are discussed in chapter 3. Test results are classified at a variety of levels. Due to the desire to remain unclassified in this treatment, tests are not discussed in detail and the test that are mentioned are certainly not an inclusive list of USAF or joint programs.

54. I did not solve the debate regarding whether offensive attack operations are merely another version of OCA missions for the USAF. However, propositions are presented in chapter 5 as suggestions to assist in resolving this debate. Also, debates over the effectiveness of preemptive operations continue, as a legacy of World War II and the Gulf War—as do debates over the Patriot’s effectiveness in Operation Desert Storm.

## Chapter 3

# Theater Missile Defense and Antimissile Options

*War, like most things, is a science to be acquired and perfected by diligence, by perseverance, by time, and by practice.*

—Alexander Hamilton

Chapter 2 presented milestones that led to the current modern TBM threat and service philosophies to deal with that threat. A historical treatment leads to several questions that are addressed in this chapter. Since TMD is a process, not an event, this chapter presents a variety of solutions that, in the spirit of synergy and jointness, should be mixed together to increase their effectiveness. However, it is necessary to point out that the historical legacy of World War II Army Air Forces attack operations against V-1 and V-2 sites is now addressed in Joint Publication (JP) 3-01.5, *Doctrine for Joint Theater Missile Defense*, as AO. This publication considers inherently offensive AO as part of a joint concept of missile “defense.”<sup>1</sup> Service philosophy, honed throughout the last five decades, affects TMD versus antimissile offensive actions not only from a matter of perspective but also from the point of view of the true nature of defense.

First, this chapter includes a discussion of the current and near-term TBM threat, answering the question: Is there a current threat and what is it? This will establish the need for improved TMD. Second, the rationale for countering the TBM threat is discussed to establish the political and military reasoning process that will be used as a point of departure for further discussion. Third, current TMD options and concepts of operations follow, addressing the question: What is planned to positively affect the TBM situation? USAF systems and concepts are covered in more detail, but doctrinal debates shall be avoided. Additional options, some advanced technological programs, and others not found in the author’s research are presented in chapter 4, as these core and other systems are evaluated.

### The Threat

In *Strategic Exposure*, an Army-sponsored RAND study, Ian O. Lesser and Ashley J. Tellis propose that within 10 years every southern European capital will be in the range of ballistic missiles based in North Africa or the Levant (including Syria, Iraq, and Iran).<sup>2</sup> They propose that coalition building will become more complex as missiles proliferate in the Mediterranean and Levant. “European allies, including states such as Portugal, Spain, Italy, and Greece, which lack well-developed national means of deterring WMD attacks, might still offer access to bases and air-



space, or contribute forces based on strong collective interest. But dialogue with the United States on these matters will be very different if Madrid, Nice, or Naples are clearly at risk.”<sup>3</sup>

Lt Gen Richard Bethurem, Allied Air Forces Southern Europe and Sixteenth Air Force commander, agreed with *Strategic Exposure*. General Bethurem said that the threat in the NATO Mediterranean region has shifted dramatically from the north to the east and south, with the focus in Europe changing “from the Fulda Gap to the South.”<sup>4</sup> However, not all ballistic missile threat countries are in or near the Mediterranean region. The BMDO cites that the countries shown in table 1 have or are in development or testing of ballistic missiles.

**Table 1**  
**Developing Countries and Ballistic Missiles**

<b>Afghanistan</b>	Scud B
<b>China</b>	B-610, M-11, M-9, CSS-2
<b>Egypt</b>	Scud B, Scud C, CSS-8, IRAN-170
<b>India</b>	Prithvi, Agni
<b>Iran</b>	Scud B, Scud C, Al Hussein, Al Abbas, Frog
<b>Israel</b>	Lance, Jericho 1, Jericho 2B
<b>Libya</b>	SS-21, Scud B, Al Fatah
<b>North Korea</b>	Scud B, Scud C, No Dong, Taep'o Dong 1, Taep'o Dong 2
<b>Pakistan</b>	Hatf 1, M-11, Hatf 2
<b>Saudi Arabia</b>	CSS-2
<b>South Korea</b>	NHK 1, NHK 2, Lance
<b>Syria</b>	SS-21, Scud B, Scud C, Frog
<b>Vietnam</b>	Scud B
<b>Yemen</b>	SS-21, Scud B

Source: “Ballistic Missiles and the World Security Environment,” *BMDO Fact Sheet*, 12 January 1998, n.p.

## **The Rationale behind Countering the Threat**

Daily news and monthly publications are replete with references to theater ballistic missiles, weapons of mass destruction, and nonproliferation issues. Since the employment of TBMs and WMDs has been relatively rare, historically, why is the national and perhaps the international psyche so preoccupied with missiles and weapons with “little military significance?”<sup>5</sup> Positions taken by two powerful leaders during the Gulf War exemplify the military and political positions on TBMs—illustrating the common reprise, “where you stand depends upon where you sit.” As General Schwarzkopf wrote, “So in essence what they had was a weapon (Scud) that they (Iraq) could fly 300 miles and miss the target by a couple of miles with a warhead of only 160 pounds. Militarily, that was the equivalent of a single airplane flying over, haphazardly dropping one small bomb, and flying away—terrible for anyone it happened to land on, but in the grand scheme of warfare, a mosquito.”<sup>6</sup>

This contrasted dramatically with Secretary of Defense Dick Cheney’s evaluation that reflected the strategic implications of the Clausewitzian refrain, “War is merely the continuation of policy by other means.”<sup>7</sup> The political and strategic potential of TBMs armed with WMD again overrode the military appraisal. Cheney’s comments, based on an obvious political-strategic point of view, as related by an aide: “God- - - it, I want some coverage out there. If I have to talk to Schwarzkopf, I’ll do it. . . . As long as I am secretary of defense, the Defense Department will do as I tell them. The number one priority is to keep Israel out of the war.”<sup>8</sup>

Secretary of Defense William Cohen’s *Annual Report to the President and Congress*, 1998, states that “the U.S. missile defense program places the highest priority on Theater Ballistic Missile Defense (TBMD) and Cruise Missile Defense (CMD) programs to meet today’s threat.”<sup>9</sup> The National Missile Defense program is relegated to second priority based on available technology, the level of threat, and spin-off technology from the TBMD efforts.<sup>10</sup> In a similar vein, a majority report of the US Senate’s Subcommittee on International Security, Proliferation, and Federal Services (part of the Committee on Governmental Affairs) confirmed the necessity for counterproliferation efforts and recognized the extent for WMD and TBM proliferation as a significant and growing threat. Additionally, country by country, the Senate report discusses specific capabilities and threat possibilities and consideration. The subcommittee states that “The United States, like Gulliver, is a giant vulnerable to smaller nations. But unlike Gulliver, who was tied down while blissfully unaware of his surroundings, our government knows the new dangers presented by the world’s rogue regimes. Now is the time to take decisive action to protect ourselves from the proliferation of weapons of mass destruction and their delivery systems.”<sup>11</sup>

This concept of vulnerability dovetails with the national debate over casualties. Conventional wisdom stipulates that if casualties increase, the

US public will require either a withdrawal of force or escalation for revenge. However, the evidence of history does not necessarily support these conclusions. Nevertheless, arguments against attack operations (or offensive operations over an enemy's territory) to destroy TBMs and associated equipment use casualties as a prohibitive element. Concurrently, some pundits rationalize that lower tier defensive systems, regardless of actual effectiveness, are preferable because they portend less loss of US life. This too is not necessarily accurate as destruction of WMD armed TBMs is best done as far from friendly troops or allies as possible. A recent study on casualty acceptance illustrates the deceptive nature of the casualty argument against offensive systems: "The public's aversion to losses of U.S. life in recent U.S. military interventions thus has less to do with a recent decline in the public's willingness to accept casualties than the debatable (and debated) merits of the cases themselves. In fact, the public shows a highly differentiated view of recent U.S. military operations that argues against the simplistic view that the public is unwilling to accept casualties under any circumstances."<sup>12</sup>

This position of this Senate committee supports the position of the president regarding TMD. Unfortunately, the president does not mention the USAF TMD systems, relying instead on the catcher's-mitt systems to illustrate the conventional perceptions of TMD. On 22 May 1996 President William J. Clinton, during commencement ceremonies at the US Coast Guard Academy, remarked that:

All of these things are focused on reducing the threat of weapons of mass destruction. But we also have to be prepared to defend ourselves in the extremely unlikely event that these preventive measures fail. That's why we're spending \$3 billion a year on a strong, sensible, national missile defense program based on real threats and pragmatic responses. Our first priority is to defense against existing or near-term threats, like short- and medium-range missile attacks on our troops in the field or our allies. And we are, with upgraded Patriot missiles, the Navy Lower and Upper Tier and the Army THAAD.<sup>13</sup>

The development of counterproliferation policy and awareness of the theater ballistic missile's potential for strategic effects from a militarily marginal weapons system has rapidly grown since the Gulf War. Though there are differences in policy over sanctions and economic incentives regarding WMD and missile proliferation, there is general agreement that some defense is required for US troops, allies, and eventually the US mainland. Therefore, TMD has grown from a cottage industry to a national priority. However, service priorities and philosophies affect the R&D plans.

## **Requirements**

The *Theater Missile Defense Mission Need Statement*, approved by the Joint Requirements Oversight Council on 18 November 1991, calls for the requirement for a TMD capability. This envisioned mission focused on the protection of US forces, US allies, other important countries, and areas of vital interest from theater missile (TM) attacks. Furthermore, the TMD objectives are to:

- Prevent launch of TMs against US forces, US allies, and other important countries including areas of vital interest.
- Protect US forces, US allies, other important countries, and areas of vital interest from TMs launched against them.
- Reduce the probability of and to minimize the effects of damage caused by TM attack.
- Detect and target TM platforms, to detect, warn and report of TM launch, and to coordinate a multifaceted response to a TM attack and to integrate it with other combat operations.<sup>14</sup>

The coauthors of the JROC amplified the mission statement in a memorandum they authored concerning the need to pursue TMD. Their statement also shows the progression in the importance of TMD after the Gulf War, including the political and military overlap of the strategic consequences of TMs, particularly with WMD.

The term theater missile belies its import. They are not just another combined arms battlefield weapon. The motives of potential adversaries to possess these weapons are decidedly strategic. They offer a relatively low cost way to threaten population centers and critical military targets like ports and other points of entry in order to coerce neighbors, breakup coalitions and deter US military involvement in their region. They can raise the stakes even higher when they carry chemical, biological or nuclear payloads. The gravity of this threat requires continued special attention be given to efforts to counter it.<sup>15</sup>

The JROC Mission Needs Statement (MNS) for TMD also made the observation that the TM threat could not yet be countered by any single system—a mix of capabilities was required. “TMD will require a balance of integrated Attack Operations, comprehensive active defense against missiles in flight, extensive passive measures, and a robust C<sup>3</sup>I and surveillance capability responsive to unique TM characteristics.”<sup>16</sup> This helped to institutionalize the requirement for a variety of approaches, but with the freedom and necessity to integrate completely different systems and philosophies, doctrinal friction resulted.

## Doctrine

JP 3-01.5 is a good attempt at consolidating multiservice TMD philosophies. JP 3-01.5 defines four operational elements of TMD: passive defense; active defense; attack operations; and command, control, communications, computers, and intelligence. Passive defense concerns efforts to reduce vulnerability and minimize effects of TM attacks. Active defense includes operations that destroy TM “airborne launch platforms” or missiles in flight. Attack operations include operations to “destroy, disrupt, or neutralize TM launch platforms and their supporting structures and systems.” C<sup>4</sup>I coordinates and integrates. However, **“All TMD systems must integrate with the existing command and control (C<sup>2</sup>) architecture.”**<sup>17</sup> The joint TMD pillars are shown in figure 1, which also represents a visual of the JP 3-01.5 concept.<sup>18</sup> It is important to note that the USAF dominates in the attack operations and BMC<sup>4</sup>I pillars. Once the airborne laser

is operational, the USAF will become more involved in the “shooting” segment of active defense.

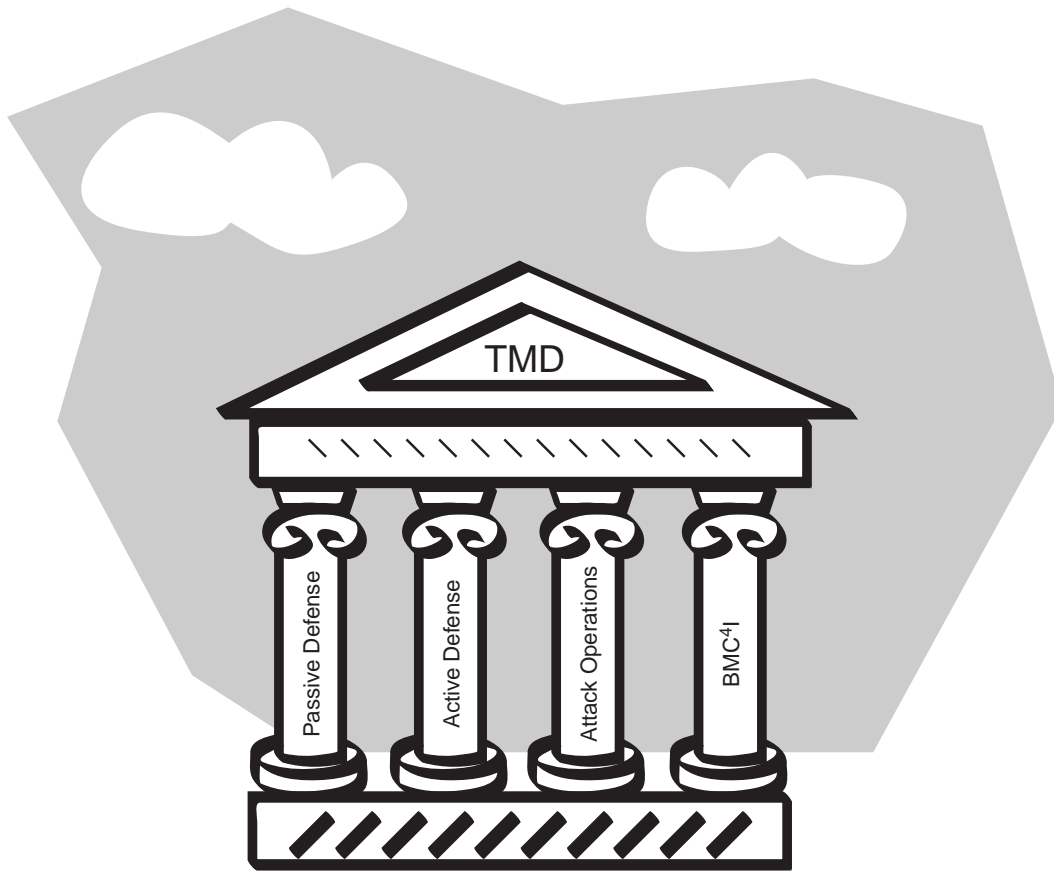


Figure 1. The Current Joint Theater Missile Defense Concept

The historical differences between the services create inherent conflicts. The general disagreement regards the USAF historical concept that airpower is best employed offensively, but TMD is discussed with ground-forces frames of reference where defense is absorbing punishment in an attempt to regain the initiative and go offensive. As the Army's previous Field Manual (FM) 100-5, *Operations*, states, "Defensive operations control the enemy's attack while preserving the defending force."<sup>19</sup>

A conventional delineator between defensive and offensive actions in the USAF, as stated in Air Force Doctrine Document (AFDD) 1, *Air Force Basic Doctrine*, is the enemy border. Offensive counterair is defined as the freedom from attack and the freedom to attack. This is based on the USAF proposition that "air and space forces are inherently offensive and yield the best effect when so employed."<sup>20</sup> However, since the joint publication takes precedence, application of AFDD 1 to the joint concept of AO

requires reconsideration. Additionally, the ABL destroying ascending enemy missiles might be considered defensive counterair (DCA), using AFDD 1's definition of protecting friendly forces, material, and infrastructure unlike the use of SOF teams or fighter-bombers to preemptively destroy BM launchers (OCA) or missile supply depots (AI or SA).<sup>21</sup> Another interpretation, elegant in its simplicity, was made on stage at the November 1997 Air and Space Conference: OCA is parts falling on the enemy's side of the border while DCA is parts falling on our side.<sup>22</sup>

Air Combat Command (ACC) produced a combat air forces paper, *Concept of Operation for Command and Control against Time Critical Targets*. The coordinated position states that "the Air Force core objective for this concept is to attack and destroy Theater Missiles (TMs) and other TCTs as far into the enemy's territory as possible, when they are least threatening to friendly forces."<sup>23</sup> The theater air control system is the joint air component commander's C<sup>2</sup> network to engage all TCTs except in close air support (CAS) operations. Though produced before the current AFDD 1, this document illustrates the USAF's attempt to operate within the structure of the JP 3-01.5. ACC defines AO as comprised of OCA, air interdiction, and strategic attack. Moreover, they state that "Attack Operations prevent TM attacks."<sup>24</sup> Furthermore, DCA is the USAF version of active defense that *limits damage* from TM attacks and passive defense incorporates early warning; nuclear, biological, and chemical (NBC) protection; concealment; and hardening.

Obviously, there is doctrinal friction. Some of the more salient points of contention include the role of the JFACC controlling all air defenses in theater, the line between AO and interdiction or strategic attack (especially when WMD is considered), allocation of space assets or other C<sup>2</sup> assets to BMC<sup>4</sup>I functions, and the proportionality of funding offensive versus catcher's-mitt systems. However, though some measures should be resolved, the inherent friction with and between services and agencies is healthy to keep doctrine from becoming stagnant and therefore dogma.

### **Options for TMD**

The BMDO has several programs that it considers as core programs. These include the PAC-3, Navy Area TBMD, THAAD, and Navy theaterwide (NTW) systems.<sup>25</sup> Additionally, the improved homing-all-the-way-killer (HAWK) missile system, ABL, AO, BMC<sup>4</sup>I, Arrow, medium extended air defense system (MEADS), and other systems make up ancillary programs, complementary, or competing systems. Various concept of operations (CONOPS) are recommended for the systems, their integration, and C<sup>2</sup>. This section reviews the core systems briefly, discussing those and some other systems for familiarity with the FoS architecture options. Additionally, a few unique concepts for systems or systems integration are presented. Since a multilayered approach is prudent, there is no intent to disparage systems, just present facts in this section, which sets the stage for comparing the systems and added operational possibilities in chapter

4. See figure 2 for a graphic depiction of the systems, their anticipated phase of use, and the USAF paradigm of operations compared to joint terminology.

#### **Lower Tier: Terminal Phase Systems**

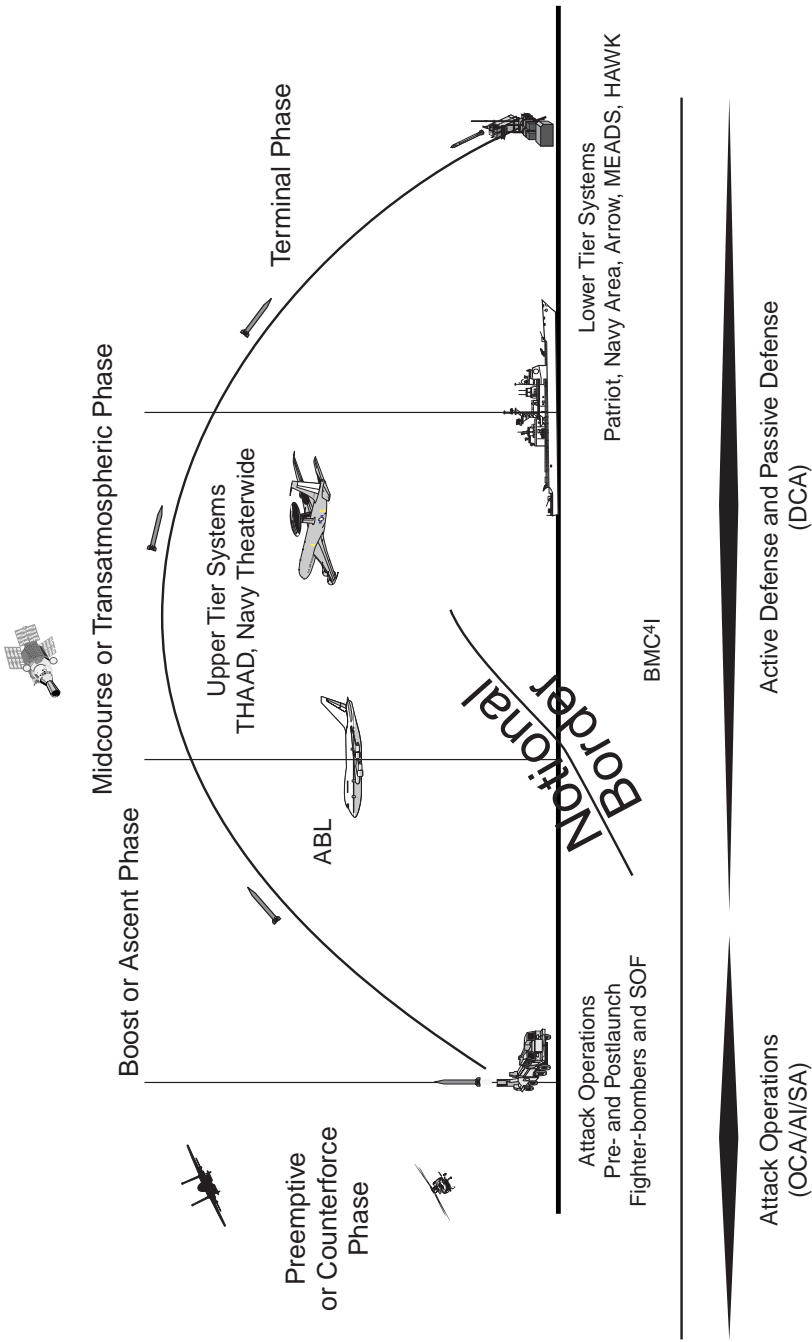
**Patriot.** The Patriot advanced capability is the upgraded follow-on to the Gulf War weapon that appeared so successful during the conflict. According to Secretary Cohen, the PAC-3 “provides air defense of ground combat forces and high value assets against high performance air-breathing and theater ballistic missiles.”<sup>26</sup> A core BMDO system, PAC-3 is a point defense weapon that has some ability to defend against cruise missiles, aircraft, and TBMs—in their terminal phase. PAC-3s can be airlifted. Though airmobile, it is a relatively stationary system.

According to the BMDO, the PAC-3 is the most mature of all the TAMD systems. This system’s third and final configuration is undergoing testing, and it is currently in the engineering and manufacturing development (EMD) acquisition phase. The first unit equipped (FUE) date is late in fiscal year 1999.<sup>27</sup> One essential feature of the PAC-3 is that it is a hit-to-kill system that detractors frequently describe as hitting a bullet with a bullet. However, the BMDO emphasized the capability to counter WMD through hit-to-kill systems.<sup>28</sup>

**Navy Area.** The Navy Area system is a terminal defense missile launched from Aegis cruisers (*Ticonderoga* class) and destroyers (*Arleigh Burke*-class).<sup>29</sup> The goal of the Navy Area program is to provide “US forces, allied forces, and areas of vital national interest with an active defense against theater missiles.”<sup>30</sup> This system was not approved for entry into EMD until February 1997. The Navy Area manufacturing development (MD) program builds on the current Aegis/Standard missile air defense system, including radar and missile upgrades. The Navy emphasizes that seaborne TMD provides reduced costs by building upon current platforms and will reduce demands on airlift and sealift.<sup>31</sup> Its testing schedule includes flights planned in FY 1999 with sea tests in FY 2000. A core BMDO weapons system, FUE in FY 2002 is expected for the Navy Area system.<sup>32</sup>

**MEADS.** The medium extended air defense system is a more mobile lower-tier program that the United States is cooperatively pursuing with Germany and Italy.<sup>33</sup> The BMDO states that MEADS will play a key role in reducing the risks of Army and Marine Corps operations as it is the only TMD system that “can provide maneuver forces with 360 degree defense protection against short-range tactical ballistic missiles, cruise missiles and unmanned aerial vehicles.”<sup>34</sup> The BMDO concept is that MEADS will bridge the gap between handheld, man portable systems such as the Stinger and higher-level systems like the PAC-3—an intended replacement to the HAWK. Low-rate production is tentatively planned for 2003 with fielding in 2005.<sup>35</sup> The Government Accounting Office (GAO) reports that the total cost of the Navy Area program is projected to be \$8.98 billion. Furthermore, the GAO recommended slipping the production of the Block

# Current (1998) through Midterm (2010) Capabilities



■ These terms are AF functions detailed in Air Force Doctrine Document (AFDD) 1, *Air Force Basic Doctrine*, September 1997

Source: Author has compiled information from multiple sources.

**Figure 2. Theater Ballistic Missile Phases and Selected Weapons Systems**



IVA interceptor missile until the conclusion of independent testing: "Given that each block IVA missile is expected to cost an average of about \$2 million, it could easily cost more to fix already produced missiles if problems are revealed during subsequent testing, than it could cost to restart production. We believe it may be more cost-effective to incur some restart costs, rather than enter production without adequate testing."<sup>36</sup>

**HAWK.** The HAWK is a low-to-medium altitude air defense system that has been in service approximately 40 years to date. Currently, 15 countries maintain the HAWK. It is the only ballistic missile defense system for the USMC and it is relied upon to protect Marine Expeditionary Forces. Upgrades to the HAWK have improved its ability to intercept theater ballistic missiles. These upgrades include modifying the air surveillance radar system to ease missile detection, data links, and the missile. By the end of FY 1997, the Marines possessed one thousand improved HAWKS.<sup>37</sup>

**Arrow.** The Arrow is a joint US-Israeli missile defense system program. The Arrow will be interoperable with US theater missile defense systems and will be capable "to assist in the protection of forward deployed US and Coalition forces."<sup>38</sup> The engagement footprint of the Arrow falls between the PAC-3 and the THAAD, making Arrow more of a midtier program. The Arrow Deployability Program (ADP), an integration program conducted in cooperation with the United States, will continue through 2001. The DOD hopes that Arrow flight-test data will also provide technological spin-offs and be used as a risk-reduction measure in US TMD development.<sup>39</sup>

### **Upper Tier: Midcourse or Transatmospheric Phase Systems**

**THAAD.** The theater high altitude area defense system is a core upper-tier program. THAAD will protect "broad areas, dispersed assets, and population centers."<sup>40</sup> As a ground-based high-altitude weapons system, THAAD will use exo-atmospheric and endo-atmospheric intercepts with a hit-to-kill termination of the engagement. The BMDO expects that the US Army will field THAAD in 2006.<sup>41</sup> Additionally, by hitting TBMs at longer range, upper-tier systems "will give us more time for multiple shot opportunities."<sup>42</sup> The GAO recommended that the BMDO delay initial production of the THAAD until after certification based on independent testing in an operational environment "that the system can meet its key performance requirements."<sup>43</sup> The DOD did not concur. Additionally, the GAO recommended that the secretary of defense submit an estimate of the funding that would be required to implement "a treaty compliant, longer-range missile target program consistent with the revised THAAD test schedule." The DOD partially concurred on this recommendation and noted that the BMDO is reviewing fund shortfalls.<sup>44</sup>

**Navy Theaterwide.** The NTW is an upper-tier system for the Aegis cruiser that builds upon the Navy Area system. By being placed on a ship, the NTW has the potential of mobility for a wider area defense. Beginning in 2000, the Navy will begin guided tests of the SM-3 intercepting test

vehicles. Moreover, the BMDO points out that the NTW has capabilities in other phases of flight of an incoming missile, unlike the THAAD. The NTW is designed to provide an intercept capability against medium- and long-range TBMs. When the ship is moved near the enemy TBM launch site, the NTW could intercept the TBM in the ascent phase. Depending upon Aegis positioning, the NTW might intercept a TBM along its trajectory, midcourse. When the cruiser is positioned nearer to the defended area, it would provide descent phase (including terminal) intercepts.<sup>45</sup> Fielding of this system is expected in 2006.<sup>46</sup>

### **Boost or Ascent Phase Systems**

**Airborne Laser.** The primary boost phase program is the Air Force managed and funded airborne laser program, which is scheduled to provide an airborne demonstration in 2002. DOD feels that the ABL will help deter TBM use and provide an additional TMD layer of protection because missiles struck in the ascent phase would fall back down on enemy territory.<sup>47</sup> Additionally, when future TBMs have the ability to fractionate before apogee, terminal systems could be overwhelmed.<sup>48</sup> Boost phase (or earlier) destruction would help to avert this condition. By using an onboard, passive, 360-degree infrared (IR) sensor, the ABL will be capable of autonomous detection, acquisition and tracking, as well as external cueing.<sup>49</sup> The ABL's extremely rapid deployment capability is a selling feature, as is its early detection and destruction capability.

The ABL program will integrate a "multi-megawatt Chemical Oxygen Iodine Laser into a Boeing-747 aircraft to kill boosting TBMs at ranges in excess of several hundred kilometers."<sup>50</sup> An anticipated concept of operations involves seven planned ABL aircraft, 747-400s. During a conflict, five aircraft will support two combat air patrol (CAP) orbits in a theater. Two aircraft will be on station at the CAP, two will be en route, and one will be on ground alert. The other two aircraft will be available for CONUS training or other uses. Normal station time will be 12 hours, with a 22-hour maximum. Airborne refueling will allow for 24-hour operations.<sup>51</sup>

The ABL Program Plan called for development, testing, and production between 1993 and 2008. A lethal intercept demonstration is planned in 2002, three aircraft will be ready in 2006, and the full planned capability of seven aircraft available in 2008.<sup>52</sup> The GAO made two recommendations to the secretary of defense: establish a correlation between optical and nonoptical turbulence data and validate the appropriateness of the design based of turbulence.<sup>53</sup> DOD concurred with the GAO recommendations, but the USAF disagreed that many of the faults found in the GAO report, stating that many "mis-statements and inferences contained in the GAO report appear to parallel themes voiced early in the ABL program and resolved as part of the existing . . . process."<sup>54</sup> In effect the USAF understands the GAO concerns and is already in the process of resolving or has resolved turbulence, air mass, and other contentious issues.

## **Preemptive or Counterforce Phase**

**Attack Operations.** General Fogleman succinctly defined the USAF concept of attack operations: “First, the Air Force is aggressively working to improve its ability to mount Attack Operations against mobile theater ballistic missiles (TBMs). These operations are part of the overall theater air battle which is orchestrated by the joint force air component commander, or JFACC. The goal will be to destroy enemy TBMs and the infrastructure that supports them—day or night, in good weather or bad.”<sup>55</sup>

The TMD AO objective is “to prevent launch of TMs against US forces, US allies, and other important countries, including areas of vital interest.”<sup>56</sup> To accomplish this objective, AO can be divided into six key functional areas: Intelligence, Surveillance, and Reconnaissance (ISR) Systems, BMC<sup>4</sup>I Systems, Strike Systems, Strike Weapons, TMD-AO Targets, and Mission Assessment. By focusing on the ISR, BMC<sup>4</sup>I, Strike Systems and Weapons, organizations are currently creating and applying doctrine, strategy, CONOPS, tactics, techniques, procedures, testing, training, and exercises to advance AO conceptually and materially. To serve as an AO focal point for all services and create a joint investment plan, the Joint Attack Operations Working Group (JAOWG) was created.

The JAOWG breaks AO into several prioritized activities to assist in conceptualization and investment strategies: Intelligence Preparation of the Battlespace (IPB), Classify/Identify, Data Management, Task and Direct, and Make Commit Decision. Additionally, they are aware of integration and management concerns as well as countermeasures, such as foliage penetration and penetrating weapons. Due to the time criticality of finding and destroying TBMs and associated equipment across a theater of operations, close and synergistic ties necessarily exist between AO and BMC<sup>4</sup>I.<sup>57</sup>

In the near term, by 2005, the AO game plan is to be able to find, fix, track, target, and engage TBMs and associated equipment. This plan includes attacking strategic targets such as factories. Additionally, interdiction targets, such as TBM and WMD storage sites, fixed and mobile C<sup>2</sup> nodes, and supply lines, would be subject to attack. Finally, AO target sets would include prelaunch and postlaunch TBM sites. Data link and off-platform sensors would assist in completing these missions under the rubric of AO.<sup>58</sup> Inherent in a USAF AO antimissile concept is effects-based targeting that includes the associated missions of AI, for supply lines and storage areas, and SA for the factories and C<sup>2</sup> nodes, for example. These peripheral attacks alone will not eliminate the missile threat, but they reduce the TBM/WMD threat and may contribute to further other JFACC’s objectives.<sup>59</sup>

SOF can also contribute to AO missions, but it is not discussed in detail in these forums. SOF relies on its insertion capability and requires BMC<sup>4</sup>I elements to find, fix, and track TBMs. With miniaturization and advances in bandwidth and communications technology, SOF AO activities will be

enhanced through C<sup>4</sup>I efforts. Faster or stealthier insertion methods would also assist in TMD efforts but are not necessarily TMD driven functions.

The USAF midterm projection, for the 2010 time frame, incorporates the near-term strategies plus it adds improvements to information transfer and acquisition, better precision weapons on more stealthy platforms, and more advanced C<sup>4</sup>I systems. The incorporation of stealthy assets is important because air and space superiority is required to conduct attack operations. In a nonpermissive environment, or with limited suppression of enemy defenses (SEAD) capabilities, stealth will allow unhampered AO to counter TBMs.

A 1994 RAND white paper discussed some USAF concepts for AO. The authors divided the ground prelaunch phase into two subphases: uncommitted and committed. Uncommitted refers to TBM operations before the missile system's final exposure before launch while committed starts with the final exposure and ends with the launch.<sup>60</sup> Additionally, with regards to AO, this study reports that postlaunch is the easiest defense phase (i.e., striking a TEL after it has launched, making it inoperable for future launches). Postlaunch AO should not have its importance diminished—rules of engagement may preclude preemptive operations, but striking a TEL or fixed site after launch will ensure future launches from that facility are prevented. It is important to note, however, that sensor and C<sup>4</sup>I programs are critical to the success of AO, as well as the other later phase anti-TBM concepts.

**BMC<sup>4</sup>I.** Besides the ABL and AO, the third area the USAF emphasizes in its TMD efforts is BMC<sup>4</sup>I. This area is woven into all joint TMD programs; effective BMC<sup>4</sup>I is a necessary precondition for effective TMD. Additionally, ballistic missile defense sensors, C<sup>4</sup>I, and cooperative engagement capability overlap into cruise missile defense (CMD).<sup>61</sup> The BMDO defines its role in relating the primarily USAF BMC<sup>4</sup>I efforts into their joint missions by including “early warning and dissemination, ensuring communications interoperability, and upgrading command and control centers.”<sup>62</sup> Their goal is to integrate the various systems and equipment, including sensors, interceptors, and tactical control centers into a joint theaterwide TMD architecture.<sup>63</sup>

Some BMC<sup>4</sup>I systems include uninhabited aerial vehicles, RF-16, U-2, joint surveillance, target attack radar system (JSTARS), Rivet Joint, Compass Call, Cobra Ball, and a variety of other space, airborne, and ground assets. Attack and launch early reporting to theater (ALERT) provides rapid missile launch warning from sensors and improved cueing for theater defenses. Currently operated by the 11th Space Warning Squadron, ALERT relies on IR data from the Defense Support Program (DSP) satellites, as well as other assets, to identify missile launches.<sup>64</sup> Communications occurs through data links, most notably Link 16 and the joint tactical information distribution system (JTIDS) provide connectivity between shooters and C<sup>2</sup> entities.<sup>65</sup>

The TACS provides rapid C<sup>2</sup> for TMD and other TCTs. Dynamic *battle management* is the term for the desired environment for a JFACC to operate C<sup>2</sup> efforts to include providing the correct shooter with the appropriate information at the optimal time. Dominant battle space awareness is a goal of advanced C<sup>4</sup>ISR improvements that will help meet the USAF goal of centralized control with decentralized execution of AO and other TMD and TCT efforts.<sup>66</sup> Additionally, in a joint venture with the USMC, the USAF is developing a Combat Integration Center (CIC) for use specifically against mobile TBMs. This CIC and the JFACC situational awareness system (JSAS), that allows intelligence information to be easily viewed on a laptop computer, provide further joint C<sup>4</sup>I interoperability constructs. The objective of all these C<sup>4</sup>I efforts is “a flexible, seamless command and control system.”<sup>67</sup>

## Summary

TMD is obviously more complicated in the late twentieth century than V-1 site hunting was in World War II—and will continue to become yet more complicated as enemies obtain more technology to thwart preemptive attacks and defensive measures. However, many of the same intelligence, communication, intercept, and attack problems remain—but in a more time critical and lethal environment. This chapter discussed the current and near-term TBM threat, establishing the need for improved TMD in this time when strategic implications may lie in a single conventional or WMD armed missile. The rationale for countering the TBM threat was discussed to establish the political and military reasoning process and some considerations. Linkages and cooperation between various governmental leaders, agencies, and the services were apparent. Current TMD options and abbreviated concepts of operations followed. USAF systems and concepts were examined in more detail, and doctrinal debates were introduced but avoided. Indeed, there is no dispute that a joint multilayered approach is required for increased safety in a TBM environment.

Chapter 3 evaluates the USAF options and presents some missile defense and antimissile actions implications based on the analysis of various TMD and AO options. Selected near-term options are compared, and implications are drawn from the current theater missile and US TMD situations.

## Notes

1. Joint Publication (JP) 3-01.5, *Doctrine for Joint Theater Missile Defense*, 22 February 1996. This publication is not the basis for a doctrinal debate, but an example of that debate's compromise for a joint audience. More discussion of some of the many concepts in this publication is addressed throughout chapter 3.

2. Ian O. Lesser and Ashley J. Tellis, *Strategic Exposure: Proliferation around the Mediterranean* (Santa Monica, Calif.: RAND, June 1996), x.

3. Ibid., 27 and 32.

4. Lt Gen Richard C. Bethurem, interviewed by author, 23 February 1998.

5. Michael R. Gordon and Bernard E. Trainor, *The Generals' War: The Inside Story of the Conflict in the Gulf* (Boston: Little, Brown and Co., 1995), 229. Gordon and Trainor reported that General Schwarzkopf regarded Scuds as having little military significance.
6. H. Norman Schwarzkopf and Peter Petre, *It Doesn't Take a Hero* (New York: Bantam Books, 1992), 417.
7. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1989), 87. Often quoted, but rarely read, Clausewitz saw this political-military debate clearly nearly two hundred years ago. And as Clausewitz recommended, the Gulf War Scud hunt was an example of military resources diverted for political needs.
8. Gordon and Trainor, 334.
9. William S. Cohen, *Annual Report to the President and Congress* (Washington, D.C.: Government Printing Office [GPO], 1998), 63.
10. The GAO in its 1996 *Foreign Missile Threats: Analytic Soundness of Certain National Intelligence Estimates* analysis of National Intelligence Estimates (GAO/NSIAD-96-225) produced by the National Intelligence Council argued that the NIE 95-19 was not specific and did not give enough quantifiable measures of the missile threat in various paragraphs. Particularly, the GAO believed that the NIE 95-19 understated the possibility of a missile threat to the contiguous 48 states and Canada (3). Additionally, the GAO found that some implicit assumptions were presented as statements that were not necessarily valid. These included statements about ships using cruise missiles against the continental United States and the effects the Missile Technology Control Regime had on proliferation (7). These GAO arguments are further illuminated in *Foreign Missile Threats: Analytic Soundness of National Intelligence Estimate 95-19* (GAO/T-NSIAD-97-53), testimony before the Select Committee on Intelligence, US Senate.
11. Senate Committee on Governmental Affairs, *Proliferation Primer*, January 1998, 1. Interestingly, this document was dedicated to the "28 American soldiers, victims of an Iraqi ballistic missile attack, Dhahran, Saudi Arabia, February 25, 1991."
12. Eric V. Larson, *Casualties and Consensus: The Historical Role of Casualties in Domestic Support for U.S. Military Operations* (Santa Monica, Calif.: RAND, 1996), 50.
13. President William J. Clinton, Coast Guard Commencement, address, 22 May 1996; on line, Internet, 12 January 1998, available from <http://www.acq.osd.mil/bmdo/bmdolink/html/clintoncg.html>.
14. JROC, *Theater Missile Defense Mission Need Statement* (JROCM-064-91), approved on 18 November 1991.
15. David E. Jeremiah (vice chairman Joint Chiefs of Staff, chairman JROC) and Theodore Gold (JROC cochairman), memorandum to chairman, Defense Science and chairman, Defense Policy Boards, not dated.
16. JROC, *Theater Missile Defense Mission Need Statement*, 5. Potential material alternatives and key boundary conditions were discussed further in the MNS if information on the initial TMD proposals in that document is desired.
17. JP 3-01.5, viii. Boldface is in the original document. Frequently, these elements are referred to as pillars.
18. Note figure 1 represents a visual of the JP 3-01.5 concept. Later, figure 2 illustrates a more appropriate relationship of the last three pillars with regards to borders, time, and space. Particularly, BMC<sup>4</sup>I appears to this author to be more overarching of a capability than the pillar allocated to it in the current JP 3-01.5 concept relates. The synergies are not readily apparent in this popular pillar construct.
19. Army Field Manual (FM) 100-5, *Operations*, June 1993, 6-19 to 6-22. Quote from 6-22.
20. Air Force Doctrine Document (AFDD) 1, *Air Force Basic Doctrine*, September 1997, 46.
21. *Ibid.*, 47.
22. Air and Space Conference, Maxwell AFB, Ala., 19 November 1997. Furthermore, whether from space, the ABL, or fighters, the goal was to protect ourselves from enemy airpower. That included missiles.
23. Maj Gen John W. Hawley, Headquarters ACC/DR, ACC/CC, "Combat Air Forces Concept of Operations for Command and Control against Time Critical Targets," Langley AFB, Va., 8 July 1997, 6.
24. *Ibid.*

25. "Ballistic Missile Defense—The Core Programs," *BMDO Fact Sheet 97-05*, September 1997.
26. Cohen, 64.
27. Lt Gen Lester L. Lyles, director, BMDO, Congressional Testimony before the Subcommittee on Strategic Forces Committee on Armed Services, US Senate, 24 March 1998. Patriot configuration two is currently fielded.
28. Lt Gen Lester L. Lyles, director, BMDO, "Opening Remarks," Congressional Testimony before the Subcommittee on Strategic Forces Committee on Armed Services, US Senate, 24 March 1998. This is a related but separate briefing from the actual testimony given before the Senate committee.
29. *BMDO Fact Sheet 97-05*.
30. Cohen, 64.
31. "Navy Area Ballistic Missile Defense Program," *BMDO Fact Sheet 97-18*, July 1997.
32. Lyles, congressional testimony, 24 March 1998.
33. Cohen, 64.
34. BMDO Web, "Theater Missile Defense Program Medium Extended Air Defense System (MEADS)"; on-line, Internet, 12 January 1998, available from <http://www.acq.osd.mil/bmdo/bmdolink/html/meads.html>.
35. "Medium Extended Air Defense System," *BMDO Fact Sheet 97-13*, July 1997. The dates are planned with a 60-25-15 cost ration for the United States, Germany, and Italy, respectively. France was in the initial plan, but they dropped out in the mid-1990s. Funding is committed only through the PD-V phase, so this program's success is certainly not assured.
36. Comptroller General of the United States, Report to the Secretary of Defense, *Ballistic Missile Defense—Improvements Needed in Navy Area Acquisition Planning*, GAO/NSIAD-98-34 (Washington, D.C.: GAO, November 1997), 11. DOD disagreed with GAO's recommendation. This report contains DOD's response to the GAO recommendation.
37. "The HAWK System," *BMDO Fact Sheet 97-11*, July 1997.
38. Cohen, 65.
39. "ARROW Deployability Program," *BMDO Fact Sheet 97-08*, July 1997.
40. Cohen, 64.
41. *BMDO Fact Sheet 97-05*, September 1997.
42. BMDO Web, *Theater Missile Defense Program Theater High Altitude Area Defense*; on-line, Internet, 12 January 1998, available from <http://www.acq.osd.mil/bmdo/bmdolink/html/thaad.html>, 12 January 1998. The question of why we do not expend more BMDO or JTAMDO efforts in the area of preemptive Attack Operations, which provides the most range, time, and WMD defense, is discussed in chapter 4.
43. Comptroller General of the United States, Report to the Secretary of Defense, *Ballistic Missile Defense—Improvements Needed in THAAD Acquisition Planning*, GAO/NSIAD-97-188 (Washington, D.C.: GAO, September 1997), 7. DOD disagreed with GAO recommendation. This report contains DOD's response to GAO.
44. GAO, *THAAD*, 13-14. This was derived of the DOD response.
45. "Navy Theater Wide Ballistic Missile Defense Program," *BMDO Fact Sheet 97-19*, October 1997. The SM-3 is the Standard Missile 3. The Navy Area program also builds on the Standard Missile system.
46. Gen Richard Davis, deputy director, BMDO, Special DOD News Media Briefing, 10 March 1998, n.p.; on-line, Internet, 24 March 1994, available from <http://www.acq.osd.mil/bmdo/bmdolink/html/dav10mar.html>. In the briefing, the general was asked a question concerning the NTW about early fielding if more money was given to the system. The general responded that 2006 was the anticipated time period.
47. Cohen, 64.
48. To fractionate is essentially to divide or split into multiple pieces creating a targeting problem for defensive catcher's-missile systems similar to that posed by a salvo launch.
49. Gen Ronald R. Fogleman, "The Air Force Role in Theater Ballistic Missile Defense," address delivered to the American Defense Preparedness Association/National University Foundation Breakfast Seminar Series on Missile Defense, Counterproliferation, and Arms Control, Washington, D.C., 16 June 1995.
50. *Airborne Laser, 1997 United States Air Force Issues Book*; on-line, Internet, available from [http://www.af.mil/lib/afissues/1997/app\\_b\\_14.html](http://www.af.mil/lib/afissues/1997/app_b_14.html).

51. Ibid., on-line, Internet, available from <http://www.af.mil/lab/afissues/1997/appb7.html>.
52. ABLPROG 97BRIEF – 997OIPT.PPT/SLD 9, 24 September 1997. This slide was provided by XORFS at the Pentagon, 6 February 1998.
53. GAO, Report to the Secretary of Defense, *Theater Missile Defense—Significant Technical Challenges Face the Airborne Laser Program*, GAO/NSIAD-98-37, October 1997, 13. DOD concurred with GAO's recommendations.
54. Air Staff Summary Sheet signed letter attachment, Arthur L. Noney, assistant secretary of the Air Force, AF Response to Final GAO Report on Airborne Laser, 4 December 1997.
55. Fogleman.
56. XORFS, "USAF Roadmap for Theater Missile Defense Attack Operations," archived briefing at XORFS, presented 27 July 1997 (unclassified extract dated 5 February 1998 used as reference). The TMD Roadmap task force was led by Lt Col Mo Rolfs at AF/XORFS. They incorporated a strategy to task analysis of AO and AF TMD. For further information, consult the Counterair (Theater Missile Defense) Mission Area Plan, FY 1996, 15 November 1995. This roadmap provides insight into the linkages between AO and C<sup>4</sup>I as well as some details on specific systems.
57. JAOWG, "Integrated Investment Strategy," draft briefing, 5 February 1998. This conceptual breakdown helps to understand the level of integration necessary to conduct AO on a planned basis. Budgeting information is contained in detail in this briefing.
58. Maj Brad Butz, AF XORFX and SAF AQPT, "USAF Attack Operations," briefing for General Lyles, 9 February 1998. During the research of this thesis, Major Butz was the AF XO representative to the JAOWG and intimately involved with producing USAF TMD program analysis and management.
59. Lt Col Chris W. Bowman, interviewed by author, 2 April 1998. Colonel Bowman, an experienced Pentagon AF/XOOC, Checkmate team leader, reinforced this author's supposition that attacking C<sup>2</sup>, maintenance facilities, storage, and production facilities for TBMs and associated equipment is AO. These attacks are also covered in the AFDD 1 under different rubrics, causing possible doctrinal ambiguities when compared to the concepts in JP 3-01.5.
60. David Vaughan et al., *Evaluation of Operational Concepts for Countering Theater Ballistic Missiles*, white paper (Santa Monica, Calif.: RAND, 1994), 1.
61. Cohen, 64–65.
62. BMDO Web, *Joint Theater Missile Defense Programs—BM/C<sup>3</sup>I*; on-line, Internet, 12 January 1998, available from <http://www.acq.osd.mil/bmdo/bmdolink/html/tmdccc.html>.
63. Ibid.
64. William B. Scott, "Scud Missile Warning Time Cut to Seconds," *Aviation Week & Space Technology*, 23 February 1998, 108. The 11th Space Warning Squadron is part of the 21st Space Wing, Falcon AFB, Colorado (renamed in March 1998 for Gen Bernard A. Schriever). This one unit is specified in this treatment because General Fogleman (in his "AF Role in TMD" speech cited) and this author considered the ALERT system extremely important to both BMC<sup>4</sup>I and the entire TMD architecture's functioning.
65. Fogleman. Also, there is overlap of information with the XORFS, "USAF Roadmap for Theater Missile Defense Attack Operations."
66. ACC, *CAF CONOPS for TCT*, 1 and 19–22.
67. Fogleman.



## Chapter 4

# Theater Missile Defense and Antimissile Qualitative Evaluation: Comparison and Analysis

*If asked by Congress where I think we need to invest more of our theater Air and Missile Defense dollars, my generic answer is Attack Operations.*

—Lt Gen Lester Lyles  
USAF Roadmap for Theater Missile  
Defense Attack Operations

Chapter 3 introduced the current TBM threat, the military and political rationale for defending against the threat, and acquainted the reader with the core and other primary weapons systems considered for joint TMD. This treatment certainly makes no dispute that a joint multilayered approach is required for increased safety and political leverage in a TBM and WMD environment. However, this chapter emphasizes the USAF current and near-term approach to TMD and antimissile actions.

This chapter evaluates the USAF options to distill four TMD and antimissile implications and presents a brief comparison of the BMDO core weapons systems plus attack operations. The question examined is “what is the best way to solve the USAF anti-TBM situation now?” The evaluation methodology used considers many factors described below. Some of the factors originated from joint publications, others in speeches and press releases, and still more derived through basic observation. Finally, implications of the strategic process choices are investigated, but no judgments or proposals are presented in this chapter.

### Comparisons

Correctly mixing joint capabilities and balancing the four JP 3-01.5 TMD pillars, passive missile defense, active missile defense, attack operations, and BMC<sup>4</sup>I is the goal of a synergistic approach to missile defense. This study concentrates on the last three pillars and explores prelaunch and postlaunch attack operations for the near term.<sup>1</sup> For planning, JP 3-01.5 notes that IBP, joint theater missile defense (JTMD) preparation and training, and operation planning, logistic requirements, and geographic considerations will impact early JTMD planning.<sup>2</sup> To extrapolate from those points, it is important to also consider range, cost, multimission capability, opportunity costs, environmental flexibility, limitations, joint environment functionality, and specific philosophical and systemic benefits and costs.

**Current and Near-term Weapons Systems and Capabilities.** The currently fielded systems available to provide joint TMD include a variety of BMC<sup>4</sup>I and other C<sup>2</sup> assets, attack operations weapons platforms, and PAC-2. Eliminating the passive defense pillar from consideration and reducing the overlapping TMD concept to its components by phase, this leaves the examples of current and near-term capabilities in figure 3.<sup>3</sup> It is important to note that there is a tremendous near-term gap in US capabilities, an antimissile capabilities gap, including the boost or ascent phase and the midcourse or transatmospheric phase. This places the US military in the uncomfortable position of having AO and some limited, single-mission terminal weapons systems as the only available antimissile options for the near term.

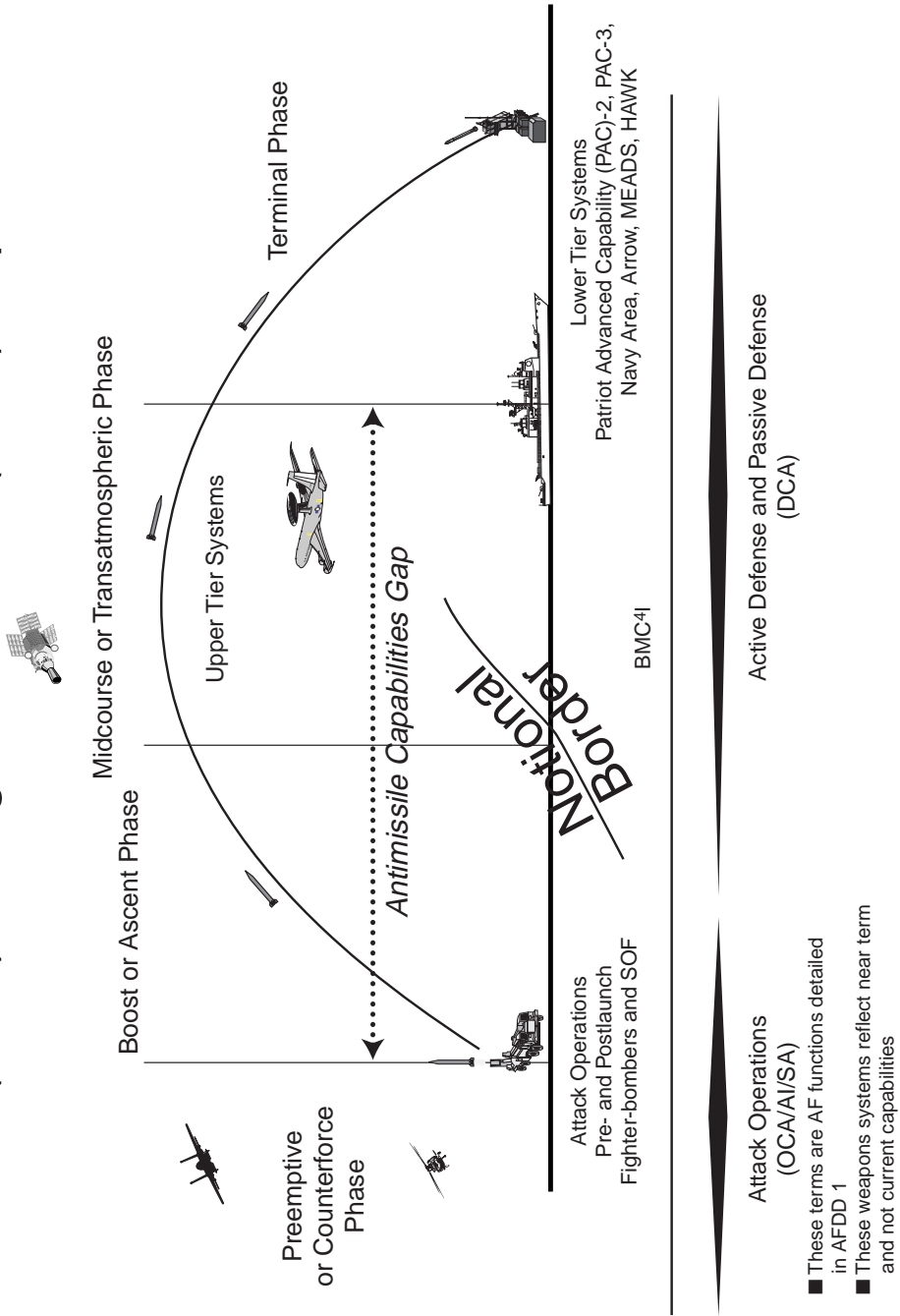
Currently, the USAF retains a tremendous role in both the BMC<sup>4</sup>I and AO categories. As the PAC-2 is presently the point defense weapon of choice, there is no rapidly deployable (i.e., within 24 hours) and/or area TMD active defense option. Therefore, currently and in the midterm, AO remains an essential first layer of TMD, and AO may be the only layer of TMD for a time. Obviously, BMC<sup>4</sup>I is likewise required for its ability to locate the launchers, C<sup>2</sup> nodes, and associated TBM equipment and contribute to tasking AO.<sup>4</sup>

To concentrate on what the USAF can do immediately and build upon in the near term, based on the current plans and time frames reviewed in chapter 3, it is necessary to consider several pros and cons of current and near-term systems. BMC<sup>4</sup>I will not be included in the matrix as it is both a BMDO and USAF priority in TMD. For without excellent BMC<sup>4</sup>I, the USAF is back to World War II Crossbow-like autonomous operations. With good BMC<sup>4</sup>I, improved Gulf War-style AO is possible. While good BMC<sup>4</sup>I may be able to achieve a fair number of postlaunch TEL, interdiction, and strategic attack kills, superior BMC<sup>4</sup>I is required to achieve significant numbers of prelaunch kills.

**Comparison of Near-term Systems.** This section compares the expected TMD and USAF antimissile systems to be available in the near term. These systems include AO (both prelaunch and postlaunch), Patriot, HAWK, and MEADS. AO is the only capability to attack missiles on the enemy side of the border, in the near term, in the preemptive or counterforce phase. The other current and near-term systems are terminal phase weapons, typically used in a point defense role. A comparison is presented, and a summary rough comparison table follows (table 2). The comparison criteria are listed as headers for brevity and ease of discussion and are defined where necessary. All analysis is qualitative not quantitative.

**Range.** A key inherent limitation of the discussed point defense terminal systems stems from the fact that they are stationary and have limited range. AO, however, provides the ability to strike deep within an enemy country. This is particularly desirable when discussing WMD, since it is preferable to destroy potential devices as far from friendly troops or cities

# Current (1998) through Near-term (2005) Capabilities



Source: Author has compiled information from multiple sources.

**Figure 3. Theater Ballistic Missile Phases and Selected Weapons Systems**

**Table 2**  
**Rough Comparison of Near-term Joint Theater Missile Defense Systems**

Categories	Preemptive or Counterforce Phase		Terminal Phase		
	AO Prelaunch	AO Postlaunch	Patriot	HAWK	MEADS
Range	+	+	–	–	0
Logistic Support Required	–	–	–	–	–
Multimission Capability	+	+	0	0	0
Opportunity Costs	+	+	–	–	–
Environmental Flexibility	+	+	+	+	+
Joint Environment Functionality	+	+	0	0	+
Limitations	0	+	–	–	–
Preparation and Training	+	+	–	–	–
Operation Planning	+	+	–	–	–
Deployment Speed	+	+	–	–	–
Political Geographic Considerations	+	+	–	–	–

as possible. SOF involvement in AO may not have the range (or speed) of fighters. Likewise, fighters may not possess the unrefueled range of bombers. Nevertheless, the range of AO provides the distinct advantage of destroying enemy TBMs as far as possible from friendly locations.

**Logistic Support.** Logistical support for AO is potentially a long train. Though it may take time to resupply a terminal phase battery, keeping a relatively large flying unit operational requires substantially more personnel than a single point defense detachment. The trade-off of required support for area capability comes at a cost. The up-front logistics of airlifting a fully equipped PAC-3 unit is not trivial. However, a sustainable AO unit requires more in personnel supply, munitions, fuel, parts, et cetera, but provides considerably greater coverage.

**Cost.** Cost is a particularly difficult characteristic to assess. To quantitatively analyze cost, R&D through testing and deployment plus maintenance expenses would require examination. Additionally, manpower costs and deployment and sustainability issues remain. When qualitatively investigating the question of comparing the costs of preemptive or area systems to more limited point defense systems, it is possible to infer that per unit cost is less for AO.<sup>5</sup> This results from the degree to which an area suppression force influences enemy behavior, whether prelaunch or post-launch. Quantifying data from Operation Desert Storm is not a reliable methodology since it is essentially a single data point. Basic cost is not rated for this evaluation for all systems.

**Multimission Capability.** The multimission versus single mission question has plagued USAF planners since the interwar period. In the recent F-22 and Joint Strike Fighter programs, however, the trend toward multimission capable platforms has reached its zenith. AO and BMC<sup>4</sup>I offer overlap with all other USAF missions and many joint endeavors. For example, an F-15E package on a deep interdiction mission might be rerouted to attack a pop-up TEL before continuing on with the remainder of its preplanned mission.<sup>6</sup> Another example is an F-16 package on an AO sortie is rerouted to provide CAS for the Army. A final example is an E-3 airborne warning and control system (AWACS) controlling an air superiority battle simultaneously using off-board data to provide a B-2, launched from the CONUS, with updated AO information. The entire AO and BMC<sup>4</sup>I system within the USAF is multimission capable, some to a greater extent than others. This is a distinct advantage to point defense systems that are TMD only, or may require some configuration changes to convert to CMD or antiaircraft defense. Active defense systems have only one mission, to shoot things down, while multifaceted USAF AO and BMC<sup>4</sup>I systems are, by nature, multirole.<sup>7</sup>

**Opportunity Costs.** The opportunity costs, costs assessed from the viewpoint of utility for multiple missions, is one area of consideration regarding AO that significantly separates USAF inputs, especially AO and BMC<sup>4</sup>I, from the terminal systems.<sup>8</sup> Due to the abundant overlapping programs in the Program Objectives Memorandum (POM), it is virtually impossible to separate and identify all antimissile specific AO and BMC<sup>4</sup>I systems from the USAF budget. Nearly every fighter, bomber, electronic combat asset and platform, UAVs, space assets, the C<sup>2</sup> network, and all associated manpower has possible linkage to the current joint TMD architecture and a future USAF antimissile offensive actions paradigm. Single mission systems, such as the Patriot, though they may carry some strategic and tactical capability, possess no operational-level capability, thus reducing their opportunity costs.<sup>9</sup>

**Environmental Flexibility.** All DOD TMD systems have various levels of environmental flexibility, though weather and terrain may negatively affect effectiveness and TCT responses. Depending upon the specific system within the FoS, or the specific weapon to be employed by a platform

in an AO function, the environment may create particular challenges. Airborne or space BMC<sup>4</sup>I systems may be somewhat affected by factors from solar storms to sandstorms. As BMC<sup>4</sup>I is affected, the potency of C<sup>2</sup> for point defenses, AO, and SOF AO is degraded. Across the board, though environmental flexibility exists for TMD systems, different environmental factors must be planned for TMD operations.

**Joint Environment Functionality.** The ability to operate in a joint environment is critical to the BMDO FoS and the integration is one of the critical functions of JTAMDO. BMC<sup>4</sup>I is the overarching requirement that spans the services and affects international TMD and counterproliferation cooperation.<sup>10</sup> The 1995 Roving Sands exercise was an example where multiple services engaged in TMD AO using BMC<sup>4</sup>I effectively. The 1997 Joint Project Optic Windmill-2 (JPOW-2), a combined and joint TMD assessment that involved the Dutch, German, and US forces, is another example.<sup>11</sup> Moreover, MEADS and Arrow are combined programs with international flavor. The ability for AO to easily incorporate Naval, Marine, and SOF forces is apparent. Operational AO and BMC<sup>4</sup>I tests conducted with the 57th Test Group and then the 53d Test Group, in coordination with Space Command (SPACECOM), since 1992, include joint applications.<sup>12</sup> Since the JROC and national political rhetoric advocates protecting allies with the US TMD FoS architecture, international and interservice interoperability, particularly with BMC<sup>4</sup>I and point defense systems is a BMDO priority.<sup>13</sup>

**Limitations.** Weather is a limitation that affects all TMD systems. Terrain may affect the efficiency of bomb-dropping AO. However, limited range is a significant limitation of all the point defense systems. The lower tier, by its nature as a last ditch defense, requires relatively close interception of TBMs. This presents critical concerns, political and military, when intercepting TBMs in a WMD environment. Currently, USAF BMC<sup>4</sup>I is particularly efficient at finding and executing AO to engage fixed TBM targets and postlaunch mobile targets. Prelaunch capabilities are limited. This does not greatly affect the lower tier systems because their function is limited to postlaunch actions only. Interoperability issues remain and provide limitations across the board, but capabilities in this area will continue to progress through the near term and midterm. Finally, territorial use and overflight treaties may limit all ground-based systems and restrict areas from which AO may be launched. Likewise, if there is no ocean near a target area for AO or a friendly city or troop concentration for Navy Area, then the USN and USMC assets may be of limited utility.

**Preparation and Training.** BMC<sup>4</sup>I required extensive training to operate systems, but these systems are multiuse and overlap with other combat IPB and ISR requirements. AO requires additional training as data-link technology improves, but again, multimission capability allows general training to be easily incorporated into unit training programs. Single mission systems require dedicated personnel and training. The near-term lower tier systems, therefore, require that more specialized per-

sonnel be taken from other potential mission areas. Battle management concepts are developing, but the flexibility, the minimal preparation time, and the terrific overlap of training for USAF AO is implied in a final draft of battle management (BM) CONOPS:

The rapid development of systems such as the CIC and SOF will enable the warfighter to efficiently divert aircraft when it is necessary to attack TCTs. These systems will also give the BM the means to coordinate with the surface component C<sup>2</sup> nodes for surface fires on TCTs. Thus, by 2003, the BM will have four procedures to combat the TCT problem: diverting airborne assets; using airborne CAP assets; coordinating for surface fires on the target; and tracking the TCT to its hide site or resupply point.<sup>14</sup>

**Operation Planning.** AO and BMC<sup>4</sup>I both require some premission planning. This may include planning to relocate C<sup>4</sup>I assets, programming specific weapons (when multimission weapons are not appropriate) for AO platforms, and theaterwide IPB familiarity for crews who might be required to operate across the enemy's full territory. Planning requirements, however, go hand in hand with training at a tactical or individual unit operational theater level. At the operational- or strategic-planning level, such as occurring with JFACC planning, once a basic strategy to task analysis is done, AO is reduced to a more commonly practiced BMC<sup>4</sup>I, OCA, AI, and SA effort. Interoperability at the joint level is required—particularly for joint weapon engagement zones and rules of engagement for lower tier air defense systems over which airpower platforms must operate.<sup>15</sup>

**Deployment Speed.** Most USAF AO and BMC<sup>4</sup>I systems are available for rapid deployment. With minimal airlift support when compared to a similarly capable ground force unit, the Air Expeditionary Force can deploy within hours and are ready for nearly immediate retasking to combat operations.<sup>16</sup> If lower tier systems are not already in position, numerous airlift sorties plus some set-up time is required to develop the catcher's-mitt capability. Navy Area is an exception and requires no airlift. Forward pre-positioning of munitions and fuel, and/or agreements for landing and operating rights may hinder the deployment speed of AEFs. That does not diminish the availability of large aircraft or refueled aircraft long-range AO and ISR activities.

**Political Geographic Considerations.** The political situation may be a factor with maintaining an AO base. Recent limitations on employing airpower out of Saudi Arabia during the February 1998 United Nations WMD inspection crisis with Iraq had the potential to hinder AO, while the overtly defensive posture retained by the Patriot was embraced. However, beyond political constraints, because of the inherent range limitations of the lower tier systems, defense of any large geographic area is currently impossible with lower tier systems. This detriment for the lower tier systems is again related to range and capability, plus the danger of detonating WMD overhead. Actual operational effectiveness and political perception are not always congruous assessments. Though AO (and BMC<sup>4</sup>I) can affect a greater area of operations, point systems may be less broadly

capable but more politically satisfactory—perhaps early in a conflict. As discussed in the Army-sponsored RAND study, *Strategic Exposure*:

In near-term crises, southern European countries will almost certainly require deployment of ATBM and air defense assets on or around their territory (regardless of the effectiveness) in order to reassure parliaments and publics. Over the longer term, development and deployment of truly effective ATBM defenses—perhaps sea based and capable of deployment around the Mediterranean—may be a prerequisite for NATO engagement outside Europe.<sup>17</sup>

**Comparison of Near-term Systems Table.** Continuing to define near term as 2005 and using published expected FUE dates, it is possible to see that a few MEADS and Navy Area resources will be available to supplement PAC-3 and HAWK. However, AO and BMC<sup>4</sup>I will remain the largest capability of the pillars beyond targeting missiles over friendly territory with terminal systems. For the comparison chart, table 2, a “+” will indicate a pro of a system while a “-” will indicate a con for that system. A “O” indicates no clear advantage or disadvantage for a specific category. It is important to note that deployment of the THAAD, the ABL, and NTW is not anticipated before 2005.<sup>18</sup>

The categories presented include range, logistic requirements, multi-mission capability, opportunity costs, environmental flexibility, limitations, joint environment functionality, preparation and training, operation planning, deployment speed, and geographic considerations, which will impact early JTMD planning.<sup>19</sup> The triple line down the center of the table represents the current and near-term Antimissile Capabilities Gap. This gap is significant because there is no currently available or planned boost/ascent phase and transatmospheric antimissile capability in the near term (see fig. 3 for the Antimissile Capabilities Gap and table 2 for the comparison of options).

## Implications

BMDO is billed as the “single voice and the architect on the family of systems,” and JTAMDO is tasked with integrating the joint systems.<sup>20</sup> Though AO is frequently mentioned, a comprehensive and integrated improvement and effective current operations plan does not exist. Regional commanders in chief (CINC) and other senior officers, particularly USAF leaders, recognize the value-added ability of AO combined with improved BMC<sup>4</sup>I, AO remains an underadvertised Air Force and airpower capability. This portends continued limited funding toward advancing AO parallel to the core BMDO activities.

Frequently heard academic and Pentagon-hallway comments espouse the conventional wisdom that AO is ineffective and undependable, therefore more money should go to defensive systems. RAND studies and admissions by BMDO leaders suggest that AO is a very real necessity in any TMD FoS. Moreover, BMC<sup>4</sup>I is an enabler that makes current AO incredibly more effective than in World War II. With the increased interest in preemptive TBM attacks, the threat of WMD, and the limited protection



afforded by point defensive systems, rapidly deployable AO will continue to increase in importance. In this era of reduced budgets, increased operational importance may not equate to significant increasing in R&D funding. Therefore, to improve the quality of AO to respond for the demand of the CINCs for integrated, improved CONOPS, and unique AO concepts are still required.

Another implication of the state of AO, principally as an AF program vice BMDO funded core program, is that training for AO missions will be required. Given the limited capability of point systems and the need for multiuse AF platforms, the BMC<sup>4</sup>I sensor-to-shooter systems will require more training and continued exercises.

A final implication discussed in this treatment regards the doctrinal relationship of the USAF AFDD 1 core competencies and functions related to JP 3-01.5 and the accepted framework and definitions of TMD. The inherent conflict remains between the land component conceptualization of defense and USAF historical view of the nature of airpower, that it is *best used offensively*. Though this conflict may not be resolved soon, a resolution of doctrinal issues in the near term will facilitate all AO and BMC<sup>4</sup>I CONOPS.<sup>21</sup> There will be a choice to ignore joint versus USAF doctrinal inconsistencies (or friction) or a need to change one or the other.

## Summary

The advantages of AO and its interface with BMC<sup>4</sup>I show the critical importance of the role of the USAF in providing AO to help reduce the impact of the near-term TMD gap. Building on chapter 2's evidence of the necessity for AO to reduce TBM attacks and inhibit much of the destructive threat of WMD before it reaches a friendly border and chapter 3's detailing of the FoS and various service inputs, this chapter compared the more obvious near-term TMD possibilities. The implications presented in a lxxiviated form include the following:

- Funding for AO specific improvements will remain limited resulting in the need for multimission weapons systems.
- The importance of having an effective, flexible, and exceedingly deployable antimissile option will increase as the threat, particularly the WMD threat, proliferates.
- Training for AO and joint BMC<sup>4</sup>I interface is required.
- Doctrinal friction between land force concepts of defense and the USAF nature of offensive airpower will continue.

Chapter 5 will build on these rarified implications and present proposals regarding the comparisons made in this chapter answering the question, "What is the best way to solve the USAF antimissile situation now?" Options are presented in the next chapter as alternatives or cost-effective near-term and midterm solutions to current USAF budgetary and technical constraints in response to the presented implications.

## Notes

1. The boost or ascent phase ABL is planned for the midterm, and any advanced technology weapons, airborne or space, would be operational beyond the time frame upon which this thesis focuses.
2. JP 3-01.5, *Doctrine of Joint Theater Missile Defense*, 22 February 1996, iii-1. The pillars are discussed throughout the text, however, they are briefly introduced on viii.
3. The planned midterm TMD architecture is included in the last chapter (fig. 2). Current and near-term systems are included because many systems will remain appropriate JTMD options. However, the midterm adds some ability to fill in the Antimissile Capabilities Gap shown in figure 3. ABL, THAAD, and NTW assist in this objective—assuming all come on line and function adequately. This does not take into account deployment rates, utilization rates, availability for two major regional conflicts, and so forth.
4. As well as provide warning for passive defense measures and point defense through the PAC-2 or PAC-3.
5. Based on footage covered versus price of coverage.
6. Information acquired through a Defense Support Program (DSP) satellite, overhead asset, UAV, E-8 JSTARS, et cetera can locate and use C<sup>2</sup> links to provide rerouting.
7. A similar comment was made during a JAOWG discussion on 5 February 1998 though the author and Lt Col Clayton K. S. Chun discussed this very point at length on 3 December 1997, and on many occasions between October 1997 and 15 April 1998. Obviously it is not a new observation. But the importance of multirole weapons systems in a budget-constrained environment cannot be overemphasized.
8. This opportunity cost also applies to the Upper Tier THAAD and NTW systems, which are antimissile systems almost exclusively.
9. *Strategic level* capabilities include capabilities beyond the theater. For example, the combination of the Scud hunt and Patriot deployment to Israel in the Gulf War had strategic implications by allowing Israel to avoid attacking Iraq directly. *Operational level* capabilities are theaterwide, such as BMC<sup>4</sup>I or AO, which have the inherent flexibility to maneuver over great distances throughout a theater. *Tactical level* applies to a specified limited area, battle or battlefield. Point defense weapons, such as the PAC-3 or HAWK are certainly tactical weapons.
10. For TBMs, cruise missiles, and WMD.
11. Mark Hewish and Joris Janssen Lok, "Stopping the Scud Threat: Engaging Theater Ballistic Missiles on the Ground," *Jane's International Defense Review*, June 1997, 40-47. This article is a good overview of a variety of joint systems used in AO, including many BMC<sup>4</sup>I systems. General Fogleman refers to this test in his "AF Role in TMD" speech cited earlier. Gen Richard Davis, Special DOD News Media Briefing, 10 March 1998; on-line, Internet, 24 March 1998, available from <http://www.acq.osd.mil/dudo/bmdolink/html/dav10mar.html>.
12. See test reports regarding Goldpan and Gold Strike, among others, for more detail on interoperability and functionality issues. Tactics and concepts are also discussed in these tests. The 57th Tactical Group (TG) was at Nellis Air Warfare Center, Nevada, then reorganized into the 53d TG. Tests are still frequently flown at Nellis, but much of the test administration is now done at Eglin AFB, Florida.
13. Davis, Special DOD News Media Briefing. A question was asked regarding the Taiwan Straits bill calling for an integrated TMD system, after a long debate in Congress on architecture, to be given to Taiwan for defense against Chinese TBMs. This TMD system would then, supposedly, reduce US military exposure to future Chinese-Taiwanese conflicts.
14. J-8, "Battle Management Concept for Joint Theater Air and Missile Defense Operations," final draft, September 1997, vi-12.
15. *Ibid.*, v-13. Many procedures and techniques also exist for integrating land defense and air offensive forces, such as wounded-bird procedures, radio-out procedures, identification friend or foe (IFF) procedures, and so forth. Many limitations exist, however, particularly in the IFF targeting practices. This document illustrated a good attempt at integrating joint BM concepts.
16. AEFs can be also categorized as Air Expeditionary Wings (AEW) or Air Expeditionary Groups (AEG). Various statements and reports make use of the different nomenclature. Wings would generally be larger than groups. Indeed, the air expeditionary strategy is meant to be flexible.

17. Ian O. Lesser and Ashley J. Tellis, *Strategic Exposure: Proliferation around the Mediterranean* (Santa Monica, Calif.: RAND, June 1996), 27.

18. "Ballistic Missile Defense—The Core Programs," *BMDO Fact Sheet 97-05*, September 1997.

19. JP 3-01.5, iii-1. The pillars are discussed throughout the text, however, they are briefly introduced on viii.

20. Davis, Special DOD News Media Briefing.

21. Air Land Sea Application Center, "JTMTD Multi Service Procedures for Joint Threat Missile Target Development," first draft, December 1997; ACC, "Concept of Operations for Command and Control in Cruise Missile Defense," draft, August 1996; Air Combat Command, *Combat Air Forces Concept of Operations for Time Critical Targets*, Langley AFB, Va., 8 July 1997; and J-8, "Battle Management Concept for Joint Theater Air and Missile Defense Operations," all reflect approaches toward facilitating and integrating CONOPS.

## Chapter 5

# Proposals and Conclusions

*The key goal for warfighters is to attack WMD facilities in a controlled fashion and WMD-carrying missiles before they reach friendly territory.*

—Barbara Starr  
*Countering Weapons of Mass Destruction:  
US Concepts Target Counterforce Mission*

Chapter 4 examines the USAF options discussed in chapter 3, distilling four implications of the present and near-term TMD and antimissile situation. The advantages of AO and its interface with BMC<sup>4</sup>I show the critical importance of the role of the USAF in providing AO to help reduce the impact of the near-term antimissile capabilities gap. While building on chapter 2's historical evidence of the necessity for AO to reduce US TBM/WMD vulnerability, chapter 3's justification for TMD and detailing of the BMDO FoS, and chapter 4's comparisons, this final chapter addresses the implications of the TMD and antimissile situation through proposals intended to enhance USAF air and space power effectiveness and ultimately national defense.

Chapter 5 expounds upon the previously presented implications and volunteers proposals erected upon the framework of the comparison and analysis made in chapter 4. The goal now is to answer the question: What strategic approach *should* the USAF take toward TMD and antimissile offensive actions in the near term? This chapter presents the nonprioritized implications given in chapter 4 followed by proposals generated to positively influence the implications. Options, generated by the author, are presented in this chapter as alternatives or cost-effective near-term and midterm solutions to reduce the impact of the gap in the current and near-term US TMD architecture. Additionally, some significant pros and cons of each proposal are presented in a table after each proposal is discussed.

### Implications of Current TMD Situation Reviewed

Below is a restatement of the compressed implications made from the analysis in chapter 4:

- Funding for AO specific improvements will remain limited resulting in the need for multimission weapons systems.
- The importance of having an effective, flexible, and exceedingly deployable antimissile option will increase as the threat, particularly the WMD threat, proliferates.
- Training for AO and joint BMC<sup>4</sup>I interface is required.

- Doctrinal friction between land force concepts of defense and the USAF nature of offensive airpower will continue.

This chapter incorporates these implications into the proposal presentation and analysis of each proposal's pros and cons. The format includes a presentation of each proposal, justification for or the author's rationale behind each proposal, and a tabular presentation of the pros and cons for each proposal and their direct relationship to each implication from chapter 4. Conclusions complete the chapter.

### **USAF Near-term TMD Proposal 1**

Establish an antimissile option against weapons of mass destruction by amalgamating and improving the capabilities of the Attack Operations Air Expeditionary Groups.

**Justification for Proposal 1: AO AEG.** Attack Operations Air Expeditionary Groups could be an amalgamation of assets that are capable of multiple mission but with additional training or specialization with the antimissile offensive mission.<sup>1</sup> Possibly, certain AF Guard and Reserve units could be restructured in a limited fashion to facilitate this concept. In any case, specific active duty and AF Reserve or Guard units could be designated as having a primary or secondary TMD AO mission. In the past, for example, fighter units often had a 60 percent/40 percent air-to-ground/air-to-air mission split. Guard/Reserve should practice some single mission and assist in constructing these AEGs, for example, UAV or info ops, or SEAD trained F-16s. Preferably, specific units, active duty or not, could be designated as having a TMD additional duty just as certain units now have Maverick tasking while others have AGM-130 tasking. Appropriate training events would be constructed.

A rough example of the primary platforms or assets that a near-term AO AEG might contain:

- 6 x F-15E for AO (back-up AI, SA, and air superiority),
- 6 x F-16CJs for SEAD and AO (back-up AI, SA, and air superiority),
- 6 x F-15C for air superiority,
- 3 KC-135s or KC-10s,
- 2 x E-8,
- 2 x AWACS,
- UAV detachment,
- pace/info ops detachment, and
- appropriate intelligence/communications and other BMC<sup>4</sup>I assets.<sup>2</sup>

An AO AEG could deploy and be ready to fight very rapidly. The smaller size of an AEG might be more palatable than full wing deployment in a sensitive political climate. Less ramp space would be required than for full wing, and the size of the TMD AEG could be tailored to fit not only to the situation but also to the political constraints of a situation. Moreover, as the first AEG deployed in a TBM threat environment, the AO AEG could shift mission priorities later if the situation changes or a crisis expands.

Additionally, the O-6 level of command for group operations may also be easier and less diplomatically controversial than mobilizing a general officer and a full AEW.

By training together, an AEG—multirole but tailored for a specific mission of AO—would have increased capabilities. Particularly as BMC<sup>4</sup>I is exercised in the field during peacetime and space, UAV, and other ISR and C<sup>2</sup> elements integrate with weapons employers. Joint assets in theater could operate with established CONOPS when working with the AEG. Current USAF doctrine in AFDD 1 would not be in conflict with the tailored AEG concept. JP 3-01.5 would not be violated in letter or spirit. The increased anti-TBM capabilities and the multirole options if a conflict expanded, allowing a flexible AO-oriented AEG to fold into a conventional AEW, are in line with the USAF core competencies.<sup>3</sup> The essence of the defensive political posturing of the AO AEG would be its offensive power, creating a capable deterrent to TBM launches. An AEG's ability to strike immediately against an aggressor, if deterrence fails, is crucial to success in both diplomatic and military arenas. See table 3 for the pros and cons of proposal one.

## **USAF Near-term TMD Proposal 2**

Establish a single USAF leader for oversight of all antimissile/WMD force planning, programming, and integrating—a USAF antimissile czar.

**Justification for Proposal 2: Establish a USAF TMD Czar.** Currently, there are at least two lead joint organizations tasked with TMD duties: BMDO and JTAMDO. Additionally, AF/XORFS conducts AO and ABL oversight. XP and the secretary of the Air Force (SAF) directorates also participate in TMD procurement and strategy discussions. XORFS program managers interact with the JAOWG and other teams and working groups regarding AO, ABL, and BMC<sup>4</sup>I. Currently, the JAOWG is led by a civilian BMDO representative and a joint staff Marine colonel—but the USAF provides a preponderance of current BMC<sup>4</sup>I and AO assets and technologies. Other agencies manage different components of the USAF BMC<sup>4</sup>I architecture. Still more directorates construct CONOPS and doctrine, both USAF and joint. The CINCs submit requirements to the Joint Staff and service chiefs. Unfortunately, there is no single senior USAF leader who organizes, trains, equips, oversees, or coordinates the *entire* USAF TMD Plan—or Antimissile Plan—from acquisition to employment.

A single leader of general officer grade would have the capacity to weave USAF antimissile concepts more completely into the planned TMD architecture. Additionally, a senior leader would be better able to incorporate the “Halt Phase” concepts and AO for the near term.<sup>4</sup> Moreover, a single point of contact or office to field USAF antimissile issues would help in doctrine and funding disagreements with other services. Table 4 presents pros and cons of proposal 2.

**Table 3**  
**Pros/Cons of Proposal 1:**  
**Establish an Antimissile/Weapons of Mass Destruction**  
**Attack Operations Air Expeditionary Groups**

<b>Implication</b>	<b>Pros of AO AEG</b>	<b>Cons of AO AEG</b>
Limited funding requires the need for multirole capability.	<ul style="list-style-type: none"> <li>Established AEG and AEW capability.</li> <li>Full multirole capability.</li> <li>Funding is available for BMC<sup>4</sup>I improvements through BMDO that will help AO AEG.</li> <li>Incorporating Air Guard and Reserves could reduce ops tempo and increase capability for similar funding.</li> </ul>	<ul style="list-style-type: none"> <li>Integration funding may not be readily available.</li> <li>Misperception of AO AEG as a separate unit and not able to fold into an AEW when required.</li> </ul>
The importance of having an effective, flexible, and exceedingly deployable antimissile option will increase as the threat, particularly the WMD threat, proliferates.	<ul style="list-style-type: none"> <li>AEG is capable of rapid deployment.</li> <li>With training and BMC<sup>4</sup>I integration, effectiveness will increase.</li> <li>AEG provides additional joint AO option.</li> <li>Passive defense can easily be incorporated with AEG.</li> </ul>	<ul style="list-style-type: none"> <li>Deterrent effectiveness is dependent upon a coordinated diplomatic/political/information effort.</li> <li>Superior destruction potential requires effective ISR and BMC<sup>4</sup>I.</li> <li>AO will require some active defense at some time in a high-threat environment.</li> </ul>
Training for AO and joint BMC <sup>4</sup> I interface is required.	<ul style="list-style-type: none"> <li>Established (and improving) AO training and tactics exist.</li> <li>Training can dovetail with current Red Flag, Green Flag, and other exercises.</li> <li>Unit-level training can be supplemented by training with units together (e.g., short TDY trips for E-8 JSTARS to operate with an F-15E unit on an AO practice session).</li> </ul>	<ul style="list-style-type: none"> <li>Additional training may require additional funding.</li> </ul>
Doctrinal friction between land force concepts of defense and the USAF nature of offensive airpower will continue.	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> </ul>

**Table 4**  
**Pros/Cons of Proposal 2:**  
**Establish a United States Air Force Antimissile Czar**

Implication	Pros of a USAF TMD Czar	Cons of a USAF TMD Czar
Limited funding requires the need for multirole capability.	<ul style="list-style-type: none"> <li>• A single USAF TMD leader will be able to better present unified USAF TMD concepts in efforts to gain funding.</li> <li>• Can coordinate with the entire USAF regarding force structure and employment issues to ensure continuity.</li> </ul>	<ul style="list-style-type: none"> <li>• Additional duty and requirement for a general officer.</li> <li>• Structural organizational changes must not allow increased bureaucracy.</li> </ul>
The importance of having an effective, flexible, and exceedingly deployable antimissile option will increase as the threat, particularly the WMD threat, proliferates.	<ul style="list-style-type: none"> <li>• A single leader will not enable better immediate employment but will allow easier coordination for field commanders because of better integration and systems effectiveness.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
Training for AO and joint BMC <sup>41</sup> interface is required.	<ul style="list-style-type: none"> <li>• USAF testing and exercises could be integrated for AO and BMC<sup>41</sup> more easily.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
Doctrinal friction between land force concepts of defense and the USAF nature of offensive airpower will continue.	<ul style="list-style-type: none"> <li>• A single voice coordinating USAF TMD efforts can only help articulate the USAF philosophy on the employment of airpower.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>



### USAF Near-term TMD Proposal 3

Continuing with all layers of the multilayered joint TMD plan, the USAF should emphasize improving and employing AO in the near term.

**Justification for Proposal 3: Emphasize Improving and Employing AO.** Chapters 3 and 4 of this treatment are replete with reasons to pursue USAF AO to counter enemy missile and WMD capabilities. However, there are a few simple reasons that build upon one another to establish a logic train for the USAF to pursue the strategic decision of AO emphasis and improvement. First, the basic USAF AO philosophy, aircraft (or Special Forces teams) striking enemy TBM facilities and C<sup>2</sup> nodes, overlaps several existing USAF doctrinal functions, in line with the USAF core competencies. Second, AO is currently the sole joint DOD or USAF option to apply the military instrument of power to destroy enemy TBM capabilities. This also applies for the near term and midterm. Third, the USAF has a long history of AO and operators currently are familiar with many of the techniques and procedures required to effectively employ AO. Finally, given the existing requirement, operational capability, and political will to establish effective TMD and counter WMD, improving and employing AO, emphasizing offensive antimissile actions, is the logical step for the USAF to pursue in the near term.<sup>5</sup> See table 5 for pros and cons of proposal 3.

### USAF Near-term TMD Proposal 4

Change joint doctrine to reflect that AO is typically an OCA mission with occasional excursions into AI and SA. This may include the overarching concept that antimissile actions are more than TMD; they include offensive, defensive, and BMC<sup>4</sup>I activities.

**Justification for Proposal 4: Change Joint Doctrine.** AO is not a defensive activity. Regardless of the emphasis given to AO by JP 3-01.5, the nature of airpower is offensive, and attacking enemy assets in the enemy's territory, whether before or after launch, is inherently offensive. Moreover, when dealing with WMD, the threat of defense is not a deterrent. Strategically, offensive capability is the basis of deterrence. Therefore, AO provides both deterrent and destruction capability. Additionally, using current USAF doctrine, OCA, AI, and SA can contribute as adjuncts to the AO concept with both direct and indirect attacks causing strategic results attributable to effects-based targeting.

According to the new AFDD 1, published in September 1997:

Because air and space forces are inherently offensive and yield the best effect when so employed, **OCA is often the most effective and efficient method for achieving the appropriate degree of air superiority.** *This function consists of operations to destroy, neutralize, disrupt or limit enemy air and missile power as close to its source as possible and at a time and place of our choosing. . . .* The aircraft and missile threat may include fixed- and rotary-wing attack aircraft, reconnaissance aircraft, unmanned aerial vehicles, air-, land-, and sea-launched cruise missiles, ballistic missiles, and air-to-surface missiles.<sup>6</sup>

**Table 5**  
**Pros/Cons of Proposal 3:**  
**Emphasize Improving and Employing Attack Operations**

<b>Implication</b>	<b>Pros of Emphasizing Improving and Employing AO</b>	<b>Cons of Emphasizing Improving/Employing AO</b>
Limited funding requires the need for multirole capability.	<ul style="list-style-type: none"> <li>• All AO assets have a multimission capability as evidenced by the fact that AO incorporates the function areas of OCA, AI, and SA.</li> <li>• The same assets that conduct AO can conduct other missions, sometimes on the same sortie.</li> <li>• Current and planned near-term munitions will be effective for the AO and AO for WMD specific missions.</li> </ul>	<ul style="list-style-type: none"> <li>• To improve AO, beyond the funding for BMC<sup>41</sup>, additional money and manpower are required to provide rapid and significant increases in ability.</li> <li>• Speeding deployment of new weapons systems is required to provide better all weather AO capabilities.</li> </ul>
The importance of having an effective, flexible, and exceedingly deployable antimissile option will increase as the threat, particularly the WMD threat, proliferates.	<ul style="list-style-type: none"> <li>• AO is both rapidly deployable and effective.</li> <li>• The TBM/WMD threat is increasing and AO is the only consistent across border antimissile capability we possess.</li> <li>• With training and BMC<sup>41</sup> integration, effectiveness will increase.</li> <li>• AEG provides additional joint AO option.</li> <li>• Passive defense can easily be incorporated with AEG.</li> </ul>	<ul style="list-style-type: none"> <li>• AO is not 100 percent effective.</li> <li>• Preemption may be perceived as inflammatory.</li> <li>• Postlaunch counterforce requires absorbing a first strike.</li> </ul>
Training for AO and joint BMC <sup>41</sup> interface is required.	<ul style="list-style-type: none"> <li>• Established (and improving) AO training and tactics exist.</li> <li>• Training can dovetail with current exercises.</li> <li>• Unit-level training can be supplemented by training with units.</li> </ul>	<ul style="list-style-type: none"> <li>• Additional training may require additional funding, particularly if additional equipment is required.</li> </ul>
Doctrinal friction between land force concepts of defense and the USAF nature of offensive airpower will continue.	<ul style="list-style-type: none"> <li>• N/A</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>

General Fogleman further articulated the AO concept thereby demonstrating the offensive nature of the activity:

Pre-emptive precision strikes against point targets and application of denial weapons will greatly hinder near-term enemy TBM activity. Meanwhile, lethal precision attacks against the TBM support tail will undercut the enemy's ability to sustain long-term ballistic missile operations. . . . If the enemy succeeds in launching a mobile TBM, detection of the launch event will key our Attack Operations. We will capitalize on the inputs from overhead and surface sensors, special operations forces, JSTARS, AWACS, Rivet Joint aircraft, U-2s and unmanned aerial vehicles—UAVs. Those inputs will identify the launch point and cue Air Force and other service assets for time-critical strikes on the enemy TEL.<sup>7</sup>

Indeed, the nature of airpower is the offensive and the nature of AO is offensive. By resolving the disconnect between BMDO and joint terminology, particularly the impact of Army influence in the TMD conceptualization, airmen will be better able to understand how their AO missions are part of not only an air campaign but an entire battle plan.

As the Air and Space Basic Course (ASBC) is growing a new generation of USAF officers with a common baseline, increasing the influence of USAF doctrine in joint TMD efforts will pay great benefits across the board.<sup>8</sup> These benefits will include an internalized USAF concept of air operations, increased AO awareness in the near term and increased Hill-visibility with better operational capability for USAF AO and BMC<sup>4</sup>I. Increased visibility benefits the political/diplomatic instrument of power by allowing counterproliferation or other negotiations to commence from a position of strength. This visibility could also lead to increased funding, which would improve the entire system. Increased AO capabilities could more effectively preempt missile attacks to help prevent catcher's-mitt systems from being saturated by salvo TBM (or cruise missile) attacks. Moreover, prelaunch and postlaunch AO could provide the JFACC with the multimission synergy produced by effects-based targeting vice a destruction only approach.

Perhaps a better configuration for a future "Joint Anti-Theater Missile Doctrine" publication would include a strawman similar to figure 4. BMC<sup>4</sup>I is the foundation upon which *all* joint antimissile and anti-WMD activities are built. Offensive and defensive actions produce cooperative and joint (or combined) "Antimissile Actions."<sup>9</sup>

The offense pillar includes flight and SOF AO, and possibly would incorporate future space and informational operations. The defense pillar would include activities that occur on the friendly side of the border, or in relation to TMD upper-tier and lower-tier weapons systems and passive defense. The defense pillar, therefore, incorporates the majority of the BMDO systems minus their particular BMC<sup>4</sup>I efforts. No organizational power would be lost, but offense-defense balance and the proper place for BMC<sup>4</sup>I would be conceptually valid and consistent. Additionally, the term *actions* refers to fires, air attacks, and effects-based targeting leading to a

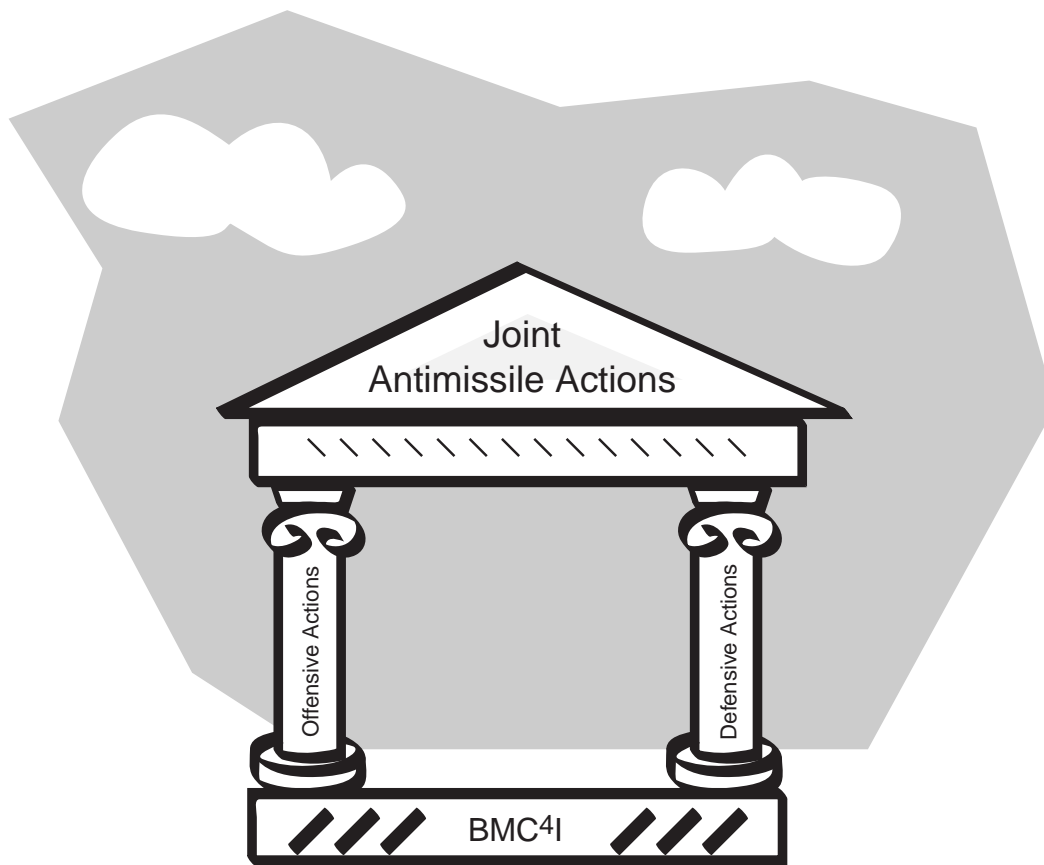


Figure 4. Proposed Simplified Joint Antimissile Concept

possible systemic collapse of an enemy's TBM capabilities. See table 6 for pros and cons of proposal 4.

### Summary

The goal of this thesis was to investigate the question: "What strategic approach *should* the USAF take toward TMD and antimissile offensive actions in the near term?" As a result, this chapter presented proposals to address the implications derived from the situation analysis in chapter 4. Hopefully, these proposals will generate some discussion to advance USAF antiballistic and anticruise missile programs. In fact, such discussions may find that separating antimissile programs from TCT concepts is not tenable. Moreover, integration of all elements of BMC<sup>4</sup>I, including information and space operations, should be included in any USAF future paradigm. The four proposals are presented briefly:

- Establish an antimissile/WMD AO AEG capability.
- Establish a single USAF leader for oversight of all antimissile/WMD force planning, programming, and integrating—a USAF anti-missile czar.

**Table 6**  
**Pros/Cons of Proposal 4:**  
**Change Joint Doctrine**

Implication	Pros of Changing Joint Doctrine	Cons of Changing Joint Doctrine
Limited funding requires the need for multirole capability.	<ul style="list-style-type: none"> <li>• Doctrine is linked to perceptions, and perceptions are certainly linked to funding. Therefore, increasing the perceived USAF AO contribution may lead to increased funding—which then leads ultimately toward better and more capable US military antimissile efforts.</li> </ul>	<ul style="list-style-type: none"> <li>• Long, hard fight.</li> <li>• Entrenched Army and Navy influence in the current iteration of JP 3-01.5.</li> </ul>
The importance of having an effective, flexible, and exceedingly deployable antimissile option will increase as the threat, particularly the WMD threat, proliferates.	<ul style="list-style-type: none"> <li>• Consistent doctrine provides both a baseline and a point of departure for rapid and effective operations.</li> <li>• Easier for JFACC to rapidly organize and administer air defense.</li> <li>• A unified front of antimissile military action is more productive than a broad-brush, defensive posture.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
Training for AO and joint BMC <sup>4</sup> interface is required.	<ul style="list-style-type: none"> <li>• Reengaging doctrinal discussions reinvigorates training, making better use of time and resources.</li> <li>• Easier for JFACC to organize and administer air defense.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
Doctrinal friction between land force concepts of defense and the USAF nature of offensive airpower will continue.	<ul style="list-style-type: none"> <li>• Encouraging doctrine discussions leads doctrine from dogma to functional, useful doctrine.</li> <li>• Doctrine should evolve with capabilities.</li> <li>• As AO and BMC<sup>4</sup> are the only offensive antimissile capabilities, current doctrine should be reevaluated.</li> </ul>	<ul style="list-style-type: none"> <li>• Possible perceptions of “rice-bowl” fights for funding.</li> <li>• Threat of overselling AO—it is not 100 percent effective, like all military operations.</li> </ul>

- Continuing with all layers of the multilayered joint TMD plan, the USAF should emphasize improving and employing AO in the near term.
- Change joint doctrine to reflect that AO is typically a counterair OCA mission with excursions into AI and SA. This should include the overarching concept that antimissile actions (AMA) are more than TMD; AMA include offensive actions, defensive actions, and BMC<sup>4</sup>I activities.

## Conclusion

Theater missile and WMD proliferation creates a new set of challenges for the USAF in this multipolar, post-cold-war world. With the help of RMA systems contributing to close the time loop between the sensor and the shooter, the near-term reinvigoration of USAF attack operations and associated BMC<sup>4</sup>I elements is possible.<sup>10</sup> Once improved, AO and BMC<sup>4</sup>I will effectively project national will and combat power while protecting our troops and allies with a strong offensive capability in a variety of situations.

Unfortunately, dogmatically written joint doctrine may negatively affect perceptions, funding, and the opportunity for the USAF to contribute to the antimissile effort. The implications and proposals are a view from the outside of an extremely complicated series of capabilities, roles and missions, and doctrinal debates. Overall, this thesis recommends that USAF near-term attack operations and BMC<sup>4</sup>I integration should be considered as part of a greater air and space power antimissile offensive counterair effort, not simply an adjunct to a surface-force-centric TMD paradigm. In the opinion of this observer, who has participated in USAF antimissile attack operations in war, training, and operational test, increased attention to air and space power antimissile offensive actions will most assuredly yield an enhanced capability to defend US national interests on a grand strategic scale.

## Notes

1. The AE Wing Battlelab at Mountain Home AFB, Idaho, could address organizational issues and configuration decisions of an AO AEG to refine the basic concept set forth in this treatment.

2. Appropriate BMC<sup>4</sup>I and administration, maintenance, and other combat elements would also deploy, and the ABL, once operational, can easily fold into this concept. This list is not meant to be exclusive, just a rough-cut of capabilities for an example. A much smaller AEG could be formed as required for the political and military situation. Additionally, Cobra Ball, Rivet Joint, Airborne Battlefield Command and Control Center, and so forth could be attached to an AO AEG or AEW.

3. AFDD 1, *Air Force Basic Doctrine*, 27 September 1997, 28. These competencies include Rapid Global Mobility, Precision Engagement, Global Attack, Air and Space Superiority, Information Superiority, and Agile Combat Support.

4. Maj Gen Charles D. Link proposed the USAF role in halting an enemy advance as the "Halt Phase" in 1997. Lt Col Jim Riggins, Headquarters AF XO/XOOC, Checkmate, discussed the Halt Phase from a strategy perspective in a briefing titled, "Perspectives on the 'Halt Phase,'" 14 January 1998. An essential element of the Halt Phase is to gain air,

space, and information superiority to protect forces and enhance further operations. The Halt Phase involves considerably more than simply killing armor.

5. Data-link test, such as Goldpan and Gold Strike, required AXQ pods on F-15E fighters for data-link capabilities. Link 16 is planned for joint use. Some funds are obviously allocated. There may be overlap, but AO can proceed even without new equipment—reliance on older methodology may be required. Older methods, such as retasking via secure radio or “in the clear” with code words, remain effective. With current USAF AO and BMC<sup>4</sup>I capabilities and near-term planned improvements, a credible AO force is possible. It is available in conjunction with the normal OCA, AI, and SA operations capability resident in current operational units.

6. AFDD 1, 46–47. Therefore, antimissile AO may be more like SEAD than DCA. The XORFS AO Roadmap parallels this point of view.

7. Gen Ronald R. Fogleman, “The Air Force Role in Theater Ballistic Missile Defense,” address delivered to the American Defense Preparedness Association/National University Foundation Breakfast Seminar Series on Missile Defense, Counter Proliferation, and Arms Control, Washington, D.C., 16 June 1995.

8. The ASBC is currently undergoing initial testing at Maxwell AFB, Ala.

9. The ground force term *fires* was intentionally not used. That lexicon leaves no room for AO that involve space or information operations that can produce AO effects but may not involve actual fires. Actions may incorporate fires and other current or future joint attacks that may be direct, indirect, lethal, or nonlethal.

10. Andrew F. Krepenovich, executive director, Center for Strategic and Budgetary Assessments, interviewed by author, 11 February 1998. Dr. Krepenovich said that, in his opinion, senior military officers were underused in policy debates and there is a program-budget mismatch that was not resolved in the Quadrennial Defense Review. AO may be part of this assessment considering the limited number of USAF AO experienced operators involved with BMDO AO activities.